News about

B. F. Goodrich Chemical *raw materials*

industry chooses these 4 cold Hycar rubbers for the toughest jobs

Where things are tough, and specifications are tougher, industry looks to these cold polymerized types of Hycar rubber to supply the answer. The exceptional properties of these rubbers have established them as the standard for *tough-job* needs, and their long list of applications is still growing.

Check them over, and investigate the ones most likely to improve your products and boost your sales. Write us for helpful information on your specific requirements. Please write Dept. EP-3 B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

Hycar 1041

High acrylonitrile copolymer. Easy processing, excellent oil and solvent resistance.

Used for oil well parts, fuel cell liners, fuel hose, rolls, lathe cut gaskets, packings, "O" rings, etc.

Hycar 1042

Medium acrylonitrile copolymer. Easy processing, very good oil and solvent resistance, good water resistance, excellent solubility.

Used for shoe soles, kitchen mats, printing rolls, "O" rings, gaskets, etc. GR-S and vinyl resin modifications, adhesives and cements.

Hycar 1043

Medium low acrylonitrile copolymer. Easy processing, good oil and solvent resistance, very good low temperature properties.

Used for gaskets, grommets, "O" rings, hose and other applications which require improved low temperature properties.

Hycar 1432

Crumb form—Medium acrylonitrile copolymer. Directly soluble—no milling required.

Used for cements and adhesives.

B. F. Goodrich Chemical Company
A Division of The B. F. Goodrich Company

Hycar
Reg. U. S. Pat. Off.
American Rubber

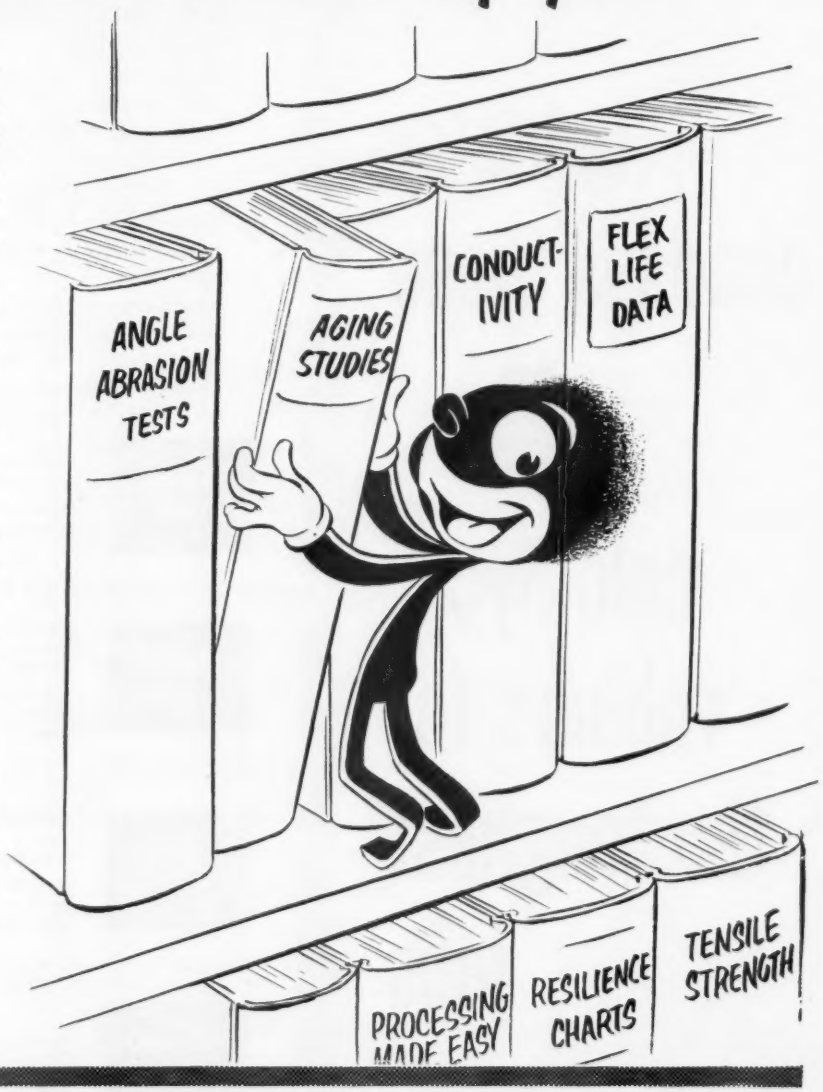
GEON polyvinyl materials • HYCAR American rubber and latex • GOOD-RITE chemicals and plasticizers • HARMON colors

PHILBLACK® has a storehouse of technical data to help you!

There's a lot of important information on carbon black and rubber right at your finger tips! It may help you make better products . . . more easily . . . and more economically, too.

For a couple of decades Phillips has been working with natural and synthetic rubbers and carbon blacks. We have tried hundreds of recipes . . . experimented with many grades of carbon blacks at various loadings and at different acceleration rates. And we have kept records of the results. This valuable information can be of help in your business.

If you have a problem concerning rubber or carbon black we'd like to see if we can help you solve it. Your Philblack technical representative will be glad to help you. Call on him for assistance, without obligation.



Meet the Philblacks!

KNOW WHAT THEY'LL DO FOR YOU!

Philblack A FEF Fast Extrusion Furnace Black
Ideal for smooth tubing, accurate molding, satiny finish. Mixes easily. High, hot tensile. Disperses heat. Non-staining.

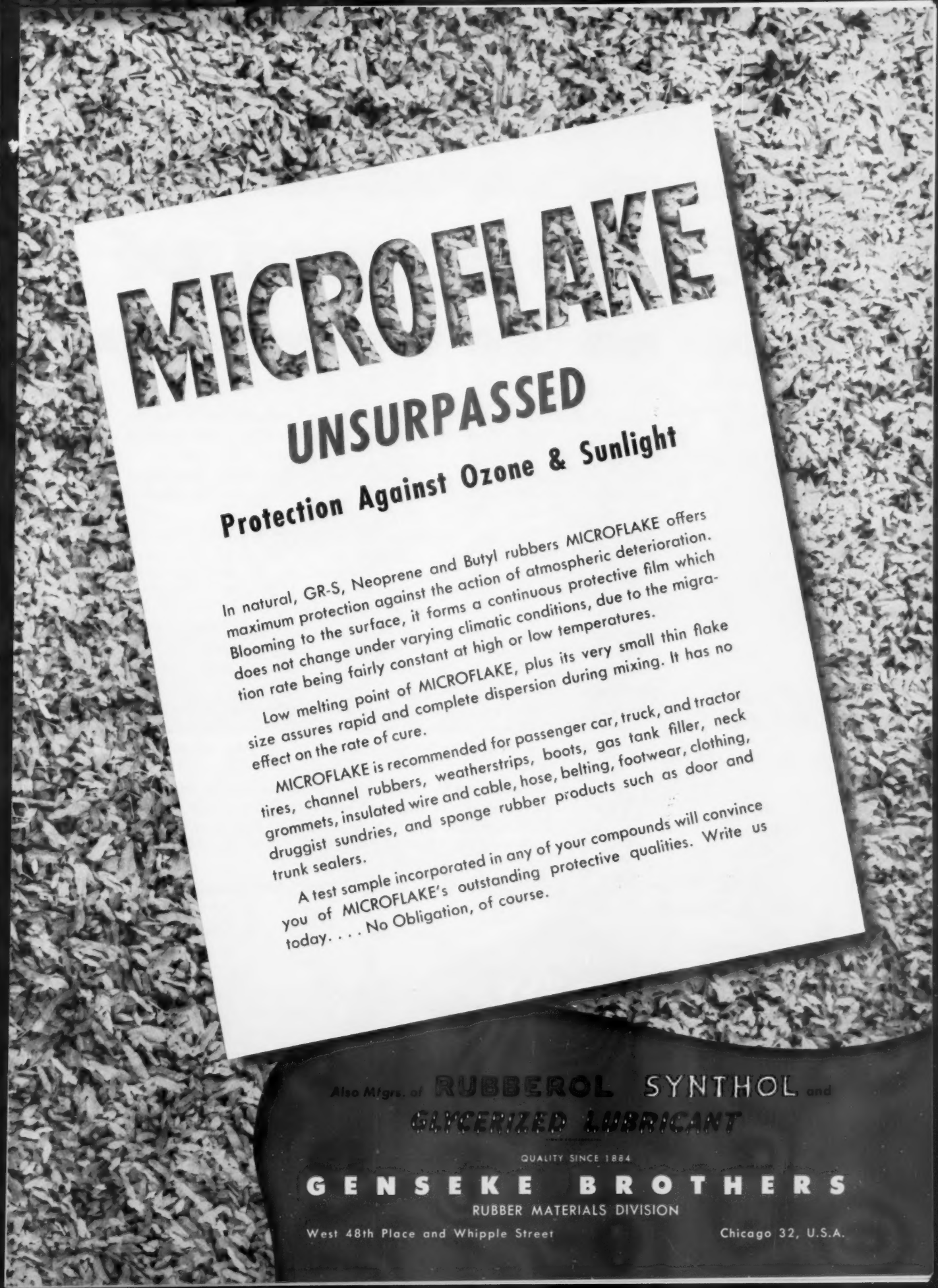
Philblack I ISAF Intermediate Super Abrasion Furnace Black
Superior abrasion resistance at moderate cost. Very high resistance to cuts and cracks. More tread miles at high speeds.

Philblack O HAF High Abrasion Furnace Black
For long, durable life. Good electrical conductivity. Excellent flex. Fine dispersion.

Philblack E SAF Super Abrasion Furnace Black
Toughest black on the market. Extreme abrasion resistance. Withstands aging, cracking, cutting and chipping.

Phillips 66

PHILLIPS CHEMICAL COMPANY, Rubber Chemicals Division, 318 Water St., Akron 8, Ohio. Export Sales: 80 Broadway, New York 5, N. Y.
West Coast: Harwick Standard Chemical Company, Los Angeles, California.


MICROFLAKE
UNSURPASSED
Protection Against Ozone & Sunlight
In natural, GR-S, Neoprene and Butyl rubbers MICROFLAKE offers maximum protection against the action of atmospheric deterioration. Blooming to the surface, it forms a continuous protective film which does not change under varying climatic conditions, due to the migration rate being fairly constant at high or low temperatures.
Low melting point of MICROFLAKE, plus its very small thin flake size assures rapid and complete dispersion during mixing. It has no effect on the rate of cure.
MICROFLAKE is recommended for passenger car, truck, and tractor tires, channel rubbers, weatherstrips, boots, gas tank filler, neck grommets, insulated wire and cable, hose, belting, footwear, clothing, druggist sundries, and sponge rubber products such as door and trunk sealers.
A test sample incorporated in any of your compounds will convince you of MICROFLAKE's outstanding protective qualities. Write us today. . . . No Obligation, of course.
Also Mfgrs. of RUBBEROL SYNTHOL and GLYCERIZED LUBRICANT
QUALITY SINCE 1884
GENSEKE BROTHERS
RUBBER MATERIALS DIVISION
West 48th Place and Whipple Street
Chicago 32, U.S.A.

key to a seal of

To many manufacturers and transporters of LP Gases, leakproof ball valves are essential to safe, loss-free operations. But developing such valves was not so simple as it may seem.

The secret of leakproofness lies in the ball seat. It must provide an effective seal, without binding, and must maintain its close fit, despite continual use and exposure.

Many valve seats of different materials were tried and tested with little success. However, precision-molded rubber seemed to hold the key. Many tries later, a compound of CHEMIGUM, reinforced with PLIOLITE S-6B, was developed which filled the bill well enough for the valve to be tested and listed by Underwriters' Laboratories, Inc., for use with hazardous gases and liquids.

CHEMIGUM is a nitrile rubber—first and finest in the field. It was selected for its ease of processing, excellent physical properties and its unusual resistance to oils, greases, chemicals, heat and abrasion – all of which would assure a close fit, regardless of operating conditions.

PLIOLITE S-6B is an easy processing, high styrene copolymer for reinforcing rubber. It was used to impart just the right hardness and smoothness for easy operation of the valve and to permit molding to extremely close tolerances.

Valve seats are but one of many types of precision-molded rubber parts that can be improved with CHEMIGUM and/or PLIOLITE S-6B. How can they help your product? Full details and the latest *Tech Book Bulletins* on both of these use-proved polymers are yours by writing to:

Goodyear, Chemical Division, Akron 16, Ohio

CHEMICAL
GOODYEAR
DIVISION

RUBBER & RUBBER CHEMICALS
DEPARTMENT

CHEMIGUM • PLIOFLEX • PLIOLITE • PLIO-TUF • PLIOVIC • WING-CHEMICALS

High Polymer Resins, Rubbers, Latices and Related Chemicals for the Process Industries

Chemigum, Pliolite, Pliolite, Plio-Tuf, Pliovic—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

approval!

SEALING UNLIMITED

against gases and liquids by this ball valve is assured by the seat molded of CHEMIGUM, reinforced with PLIOLITE S-6B. Photos courtesy International Packings Corporation, Bristol, N.H., and Rockwood Sprinkler Company, Worcester, Mass.

• a highly reinforcing white pigment

• excellent resistance to scorch

• good dispersing characteristics

ZEOLEX 23*

*Microlitic Zeolite

PHYSICAL PROPERTIES:

pH (20% water slurry)	10-11
Form	Dry Powder
Handling Precautions	None (non-toxic)
Specific Gravity	2.10
Screen Residue (325 mesh)	0.1% Maximum
Free Moisture (Maximum)	5%

Immediate shipments available

from our Havre de Grace, Md. plant

J. M. HUBER CORPORATION, 100 PARK AVENUE, NEW YORK 17, N. Y.

HUBER Manufacturers of: Channel Blacks • Furnace Blacks • Rubber Clays • Rubber Chemicals

Rubber Age

COVERING THE MANUFACTURE OF RUBBER AND RUBBERLIKE PLASTICS PRODUCTS

Published Monthly by
PALMERTON PUBLISHING CO., INC.
Editorial and Advertising Offices
101 West 31st St.,
New York 1, N. Y.
PEnnsylvania 6-6872

P. L. PALMERTON, *President*
M. E. LERNER, *Vice-Pres. & Treas.*
E. D. OSBORN, *Secretary*
CHARLES T. JANSEN, *Asst. Treas.*

STAFF

M. E. LERNER
Editor and General Manager

B. J. KOTSHER
Associate Editor

JOHN A. MOCK
Assistant Editor

KENNETH T. CORELL
Production Manager

ELLA MAY DARRIN
Circulation Manager

CHARLES T. JANSEN
Advertising Sales Manager

NEWS CORRESPONDENTS

CARL S. HOGLUND
5107 Telegraph Road
Los Angeles 22, Calif.
Phone: Angelus 1-8136.

PHIL GLANZER
223 Coldstream Avenue
Toronto 12, Ont., Canada
Phone: Mayfair 8181.

ADVERTISING REPRESENTATIVES

New England
F. ROYAL CAREY
28 Rosewood Ave., Cranston 5,
R. I.—Phone: WIlliams 1-3957.

Chicago
LARRY M. LYONS
549 West Washington St.
Chicago 6, Illinois
Phone: Central 6-0545.

SUBSCRIPTION RATES

	U.S.	Canada	Other
1 Year	$5.00	$5.50	$6.00
2 Years	7.50	8.50	9.50
3 Years	10.00	11.50	13.00

Single copies (up to 3 months) 50c
Single copies (over 3 months) 75c

CONTENTS

VOL. 78, NO. 6 **MARCH, 1956**

The Morphology of Synthetic *Cis*-Polyisoprene (Coral Rubber)—*By Ernst A. Hauser* 881

Includes detailed morphological studies of a polyisoprene exhibiting a *cis* configuration. The studies show that it is absolutely comparable to natural *Hevea brasiliensis* rubber both chemically and physically.

Gauge Control in Calendering of Vinyl Films and Sheeting—*By M. Jukich* 886

An investigation into the problem of controlling stock profile in the calendering of vinyl films and sheeting. An effective method of overcoming this problem is discussed.

Ultra Accelerators in CV Vulcanization—*By L. A. Brooks, J. L. Tronson, and A. C. Rowley* 889

An evaluation of accelerators and their combinations in the continuous vulcanization of wire insulations. Includes a discussion on two and three-way accelerator combinations.

Effect of Varying the Vulcanization Temperature on the Properties of Black Reinforced Tread Compounds—*By J. F. Svetlik and H. E. Railsback* 897

A study of cold rubber tread type compounds reinforced with various carbon blacks to determine how the physical properties would vary when vulcanized at different temperatures.

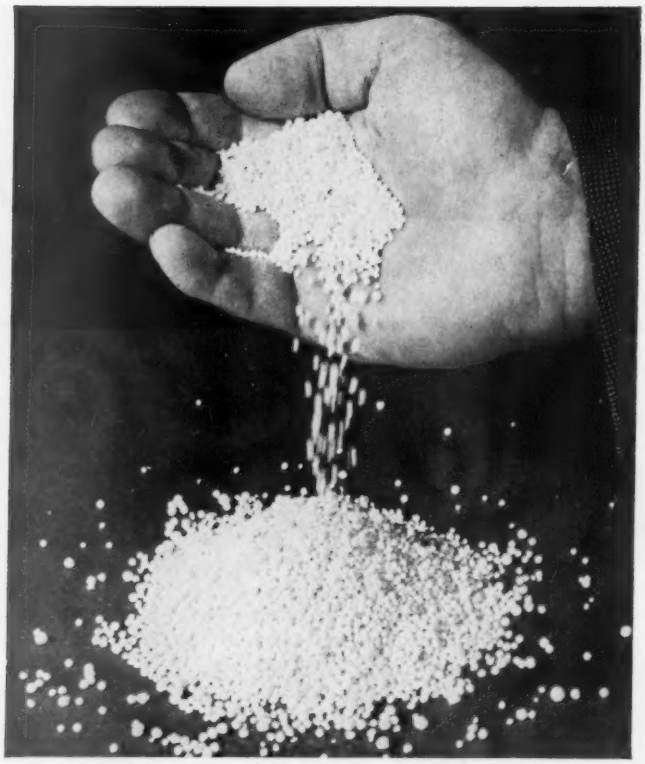
Book Reviews	958	Markets	964
Canadian News	934	Names in the News	925
Chemical Prices	*	New Equipment	950
Classified Ads	980	New Goods	942
Coming Events	911	Obituaries	938
Editorials	903	Statistics	970
Financial News	923	West Coast News	932

*Appears every other month

Microfilm copies of complete volumes of RUBBER AGE are available from: University Microfilms, 313 North First St., Ann Arbor, Mich.

Indexed in Industrial Arts Index and Engineering Index

Contents Copyrighted 1956



PELLETED PROTOX-267

...Cuts Unloading Costs up to 66%

You can make substantial savings in handling Protox-267* zinc oxide as compared with conventional oxides, whether you use manual or mechanical methods.

1. MANUAL UNLOADING

You can load on each handtruck or pallet up to 3 times as much Protox-267 because its bags are more compact. That means fewer trips from car to storage—thus faster, lower-cost unloading.

2. FORK-TRUCK UNLOADING

You can save up to $30 on unloading each 36-ton car of Protox-267 when you handle its convenient unit loads mechanically rather than by hand.

You will find Protox-267 also cuts your storage costs and processing costs.

Protox-267 bags weigh the conventional 50 pounds, but are smaller and more convenient to handle due to low dry bulking of the oxide.

*U. S. Patents 2,303,329 and 2,303,330

THE NEW JERSEY ZINC COMPANY

Producers of Horse Head Zinc Pigments

... most used by rubber manufacturers since 1852

160 Front Street, New York 38, N. Y.

HORSE HEAD PRODUCTS

IDEAS ACTION successful product DEVELOPMENT

Adamson United 7" x 14" x 28" Synthetic Rubber Baling Press with 130 Ton Main Ram.

When war forced our Government to produce synthetic rubber in great quantities, the acceptance of the challenge by American industry was a tribute to American engineering genius. In 1942, Adamson was given the assignment of developing and producing baling units which would handle the job efficiently—accurately.

Within approximately twenty weeks designs had been completed, patterns made, material collected and fabricated, and our first baling presses shipped to various synthetic rubber plants.

- **No time for Prototype Machines or try-out**
- **Immediate production was demanded and provided**

Today, those presses are in successful operation, and are being reproduced in quantities to handle 1955 requirements for nearly all of the large, synthetic-rubber manufacturing plants in the United States and Canada. European manufacturers are building their own to the original Adamson design.

In today's presses, no change in design is required, although, of necessity, these same baling units have been called upon to increase productivity by two and even three-hundred percent of the original estimated capacity. We believe that this is an outstanding example of FUNCTIONAL DESIGN WITH PROVISIONS FOR INCREASED PRODUCTION DEMANDS.

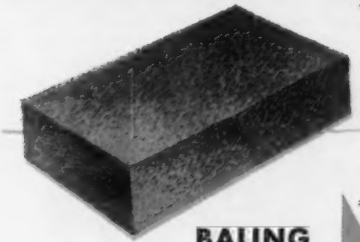
Adamson United Company

730 Carrol Street • Akron 4, Ohio

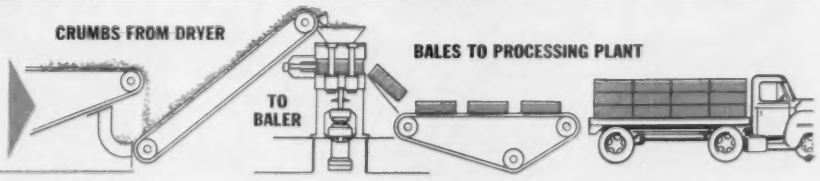
SALES OFFICES IN PRINCIPAL CITIES

Subsidiary of United Engineering and Foundry Company

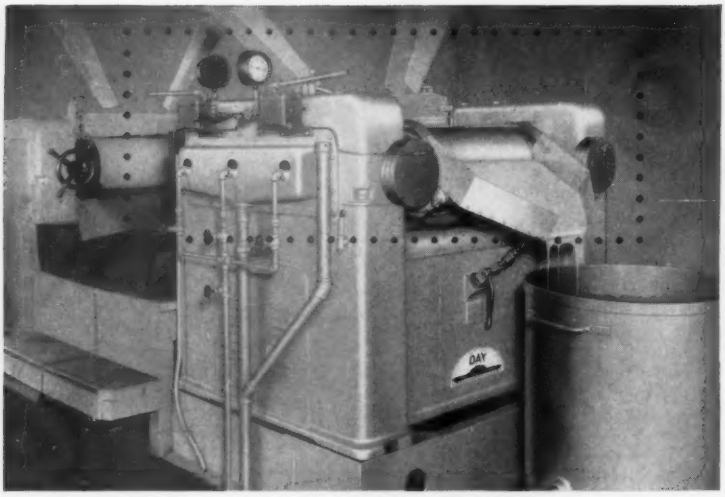
Plants at: PITTSBURGH • VANDERGRIFT • YOUNGSTOWN • CANTON • WILMINGTON (Lobdell United Division)



BALING SYNTHETIC RUBBER

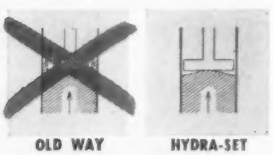


DESIGNERS AND BUILDERS OF BETTER MACHINES AND PROCESSES FOR BETTER RUBBER AND PLASTICS PRODUCTS



guessing.....
games.....are.....
over.....

DAY HYDRA-SET... a unique hydraulic roll-setting device that takes all the guesswork out of roll settings . . . developed by DAY engineering, field tested with spectacular results. One simple setting gives unvarying accuracy to your roll mill work, resulting in absolute uniformity of every batch of pigmented product. With the DAY Hydra-Set your roll position is absolutely constant once you make the setting.



OLD WAY HYDRA-SET

HERE'S WHY: The Day Hydra-Set incorporates a sealed hydraulic cylinder. A synthetic rubber diaphragm prevents piston leakage, thus maintaining constant pressure at all times.

DAY Hydra-Set comes as optional equipment on new mills or as a field conversion kit. Write for Specification Sheet I-400 R.M.

in roller mills DAY *means longer life span*

FOUNDED 1887

THE J. H. DAY COMPANY

INCORPORATED

1159 HARRISON AVENUE • CINCINNATI 22, OHIO

Quality equipment for baking, paint and varnish, printing ink, chemical, rubber, pharmaceutical, cosmetics, paper and pulp, explosives, food, ceramics, candy, soap, sugar and milk products

Eastern Canada: Brantford Oven & Rack Co., Ltd., Brantford, Ontario
Western Canada: British Canadian Importers, Vancouver, British Columbia
Mexico: T. de la Pena e Hijos, S.A., Nazas 45-A, Mexico 5—D.F

Letters to the editor

Controlling Destiny

Dear Sir:

While I always look forward to your "Review and Preview" sections when they appear in your publication, some of my colleagues doubt the wisdom or even the necessity of such a compilation. Now I work for rather a small organization, and some of our people follow the estimates prepared by representatives of the larger companies with a great deal of interest.

Others in my organization say that these "Big Fellows" control their own destiny, so to speak, and their year-end statements may be prepared more with an eye to the atmosphere they create rather than to a realistic appraisal of the situation.

While I do not wholly agree with this point of view, it does seem that some of the smaller plants in the rubber industry should be consulted so that your round-up of opinion would be more representative.

FRANK HOSTEDDER

Boston, Mass.

Suggestion Noted

Dear Sir:

Over the years you publish separate articles on a great many subjects. Why don't you gather some of these articles on specific subjects together and publish them as a monograph or as books devoted to one particular subject.

For example, if you would compile all the articles you have published in the last ten years on the subject of carbon black, you might have not only an interesting and informative volume but one which would be of great service to the rubber field.

There are probably many people in the industry who would like to have compilations like this on one or more subjects. If you would ask your readers what subjects they would like to see covered you might get some interesting answers.

L. D. PORTER

Peoria, Ill.

Dispersion Mill

Dear Sir:

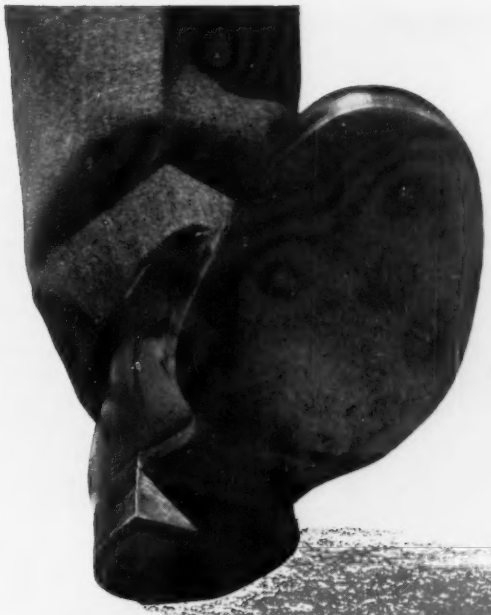
We have been using for a number of years a piece of machinery known as a Travis Dispersion mill and it is our understanding that the manufacturers of this piece of equipment have gone out of business.

We are wondering if you would know whether anyone has taken over the manufacture of this item or any similar item and, if so, we would appreciate it if you could furnish us with the correct name and address.

GERALD S. WILSON

Wilson Rubber Co.
Canton, Ohio

Our files are a little rusty on this one. If anyone can supply the information both Mr. Wilson and our own staff will appreciate it.—ED.



STEP INTO THE PRODUCTION PICTURE!

with NEW

Marbon "8000-A"®

Reinforcing High Styrene Resin

for fast mixing, high filler loadings and improved mold flow in soling!

Marbon "8000-A" resin fluxes rapidly with rubbers at lower temperatures (165-175 degrees F.) for improved dispersion, shorter mixing cycles, cleaner, brighter colors, faster heat-plasticizing action with lowered power demand. A superior-processing resin with all the reinforcing properties of Marbon 8000. Especially suitable for OPEN MILL mixing under marginal heat conditions.

- HIGH HARDNESS AND MODULUS
- SUPERIOR FLEX-LIFE
- ABRASION RESISTANCE
- HIGH HOT-TEAR STRENGTH
- ONE-STEP MIXING OPERATION

GET THE FACTS — *Write* TODAY for complete TECHNICAL LITERATURE

MARBON CHEMICAL

Division of BORG-WARNER

GARY, INDIANA

MARBON . . . . *It BLENDS as it STRENGTHENS as it IMPROVES*

CONTINUOUS PROCESSING SYSTEMS

Nylon Tire Cord Systems
for Wet or Dry Hot Stretching

Rayon Tire Cord Systems
for Regular or Super Tenacity Rayon

V-Belt Cord Impregnators
for Cotton—Rayon—Nylon—Dacron

Foam Rubber Systems
for Latex or Polyurethane

Rubberized or Coated Web Systems

Impregnation Systems
for All Types of End Products

FULL TECHNICAL INFORMATION ON REQUEST

C. A. LITZLER CO., INC.
11621 Detroit Avenue • Cleveland 2, Ohio

EXPORT REPRESENTATIVE:

Gillespie & Company of New York, Inc.
96 Wall Street • New York 5, New York

Low Brow-High Brow

Dear Sir:

It may come as a great shock to you to know that many of your readers are pretty "low brow" guys. Whenever I pick up copies of RUBBER AGE and see articles devoted to high polymer chemistry I am disappointed.

Sure, these articles appeal to the professors in the laboratory, but "low brows" like me are more interested in articles on practical compounding, cost computation, etc. It might even be a good idea to publish an article every now and again on small plant management.

Seriously, I will not disparage the general excellence of your technical articles. However, before somebody becomes a dietitian he should know something about cooking. There are still some of us who are learning this business and learning how to "cook". Before you send us into the upper echelons, we would appreciate some groundwork.

THOMAS BARBELLA

Los Angeles, Calif.

There is considerable merit to Mr. Barbella's comments, although regular reading of RA will indicate that we publish much material of a practical nature. It must also be remembered that "high brow" articles are frequently the first step where compounding and processing improvements and developments are concerned. For example, the article on morphology in the current edition is of basic importance to future compounders of the polyisoprenes. However, we welcome articles of a practical nature and invite their submission at all times.—ED.

Carbon Black Note

Dear Sir:

I was very much interested in the table you carried on Page 749 in your February issue with the descriptions of GR-S synthetic rubber polymers as recommended by the ASTM Subcommitte. I noticed the reference to the classification MAF (medium abrasion furnace) instead of FEF (fast extrusion furnace) for types 1103 and 1104. The classification of MAF is now used so little that the Subcommittee should be brought up to date on the matter.

I. DROGIN

United Carbon Co.
Charleston, W. Va.

Umbrella Suggestion

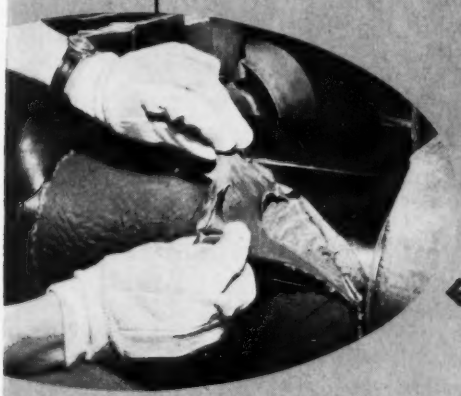
Dear Sir:

Why don't they make light weight rubber umbrellas with the edges curled up in a ruffle (sort of like a gutter edge) and have the ruffled edge lined with sponge rubber, etc., to keep the rain from dripping down one's back, shoulders, hair, and even the neck? It's time to give the umbrella a new upward look for "56." What do you think. Yes? No?

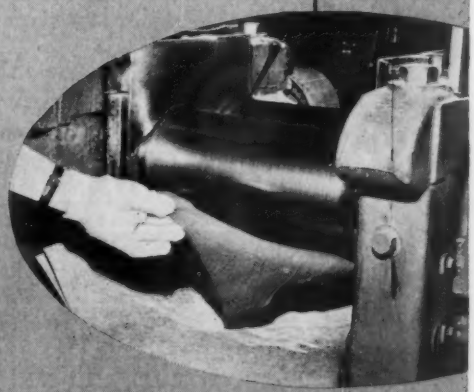
MRS. VERA LEONE

102 Oak St.
Plattsburgh, N. Y.

WEIGH THE ADVANTAGES OF NEW PLASKON† POLYETHYLENE LUBRICANTS



Neoprene stock sticks to mill, must be laboriously scraped off.



Same neoprene formulation with addition of 2 parts per 100 of PLASKON Polyethylene Lubricant. See how stock rolls smoothly from mill.

For the first time, you can have the *advantage* of a lubricant in your rubber compounding without the *drawbacks*. PLASKON Polyethylene Lubricants are a new Barrett development, completely different from ordinary waxes you may have used. They detackify at elevated mill, Banbury, and calender temperatures of 200° F. and higher... aid filler dispersion... improve mold flow and release... increase extruding and calendering speeds... reduce shrinkage of milled stocks. Troublesome elastomers, particularly neoprene and "Hypalon", actually become easy to mill.

Most important, PLASKON Polyethylene Lubricants won't bloom in cured or uncured stocks; and they're non-staining, non-discoloring, non-migrating and non-toxic. Evaluate them in your own formulations. Ask your Barrett representative for technical data and samples.

† Trade Mark of Allied Chemical & Dye Corporation

CHEMICAL PROGRESS WEEK-APRIL 23-28

Barrett

BARRETT CHEMICALS

BARRETT DIVISION, Allied Chemical & Dye Corporation, 40 Rector Street, New York 6, N.Y. In Canada: The Barrett Company, Ltd., 5551 St. Hubert Street, Montreal, P. Q.

OVER 100 YEARS OF EXPERIENCE

Allied Chemical

ST. JOE lead-free **ZINC OXIDES** are available in a complete series of grades for rubber compounds. Quality control from ore to oxide is one of St. Joe's most important production tools. This, together with prompt deliveries, unequalled and unbiased customer service, accounts for their rapidly increasing use in the industry.

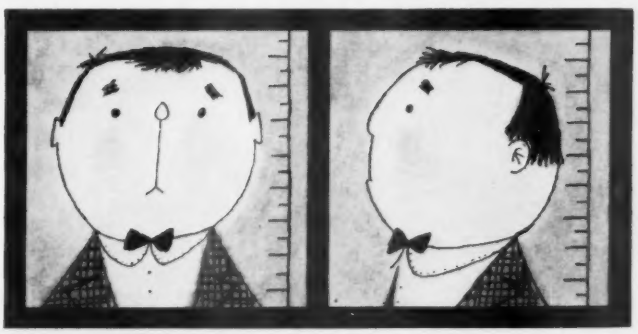
FINE PARTICLE SIZE *Fast Cure*	**Black Label #20** **Red Label #30**
MEDIUM PARTICLE SIZE *Fast Cure*	**Green Label #42, #43**
MEDIUM PARTICLE SIZE *Slow Cure*	**Green Label #42A3** **Red Label #31**
FINE PARTICLE SIZE *Surface Treated*	**Black Label #20-21**
MEDIUM PARTICLE SIZE *Surface Treated*	**Green Label #42-21**
SPECIAL GRADES FOR LATEX	**Black Label #20** **Green Label #12, #46**
PELLETIZED GRADES *Surface Treated*	**Black Label #20-21 Pellets** **Green Label #42-21 Pellets**

Complete data on all grades, and samples for testing sent on request.

ST. JOSEPH LEAD COMPANY

250 PARK AVENUE, NEW YORK 17 • Plant & Laboratory: Monaca (Josephtown) Pa.

REWARD



for any manufacturer trying
VELSICOL HYDROCARBON RESINS

★ **easier processing...** *smoother milling, better calendering, more uniform cures.*

★ **better finished product...** *greater resistance to aging, abrasion, and tearing; better insulation properties; better tensile and elongation properties.*

★ **lower materials costs...** *higher loading of resin with no degradation of quality.*

VELSICOL
CHEMICAL CORPORATION

VELSICOL

Look for this man!

. . your Velsicol representative—a qualified chemist who can show you how to make better rubber compounds at lower cost with Velsicol Resins.

Mail the coupon now for **FREE** samples and technical literature!

VELSICOL CHEMICAL CORPORATION
Dept. 81 330 East Grand Ave., Chicago 11, Illinois
Gentlemen:
☐ Please send me your technical bulletin No. 218.
☐ Please send me samples of Velsicol Resins.

NAME_____

COMPANY_____

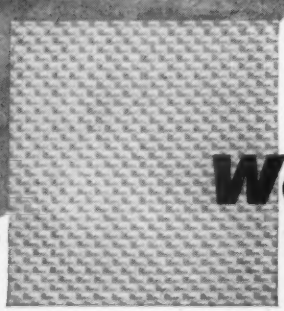
ADDRESS_____

CITY_____ ZONE____ STATE_____

There's more to Welkote than toughness!

Coated nylon tarps used by Norwalk Truck Line

How tough can a base fabric be? What else must it have besides durability? The vinyl coated truck tarp shown here provides some of the answers. It uses Welkote, the Wellington Sears multifilament nylon fabric specifically engineered as a base for vinyl and neoprene coating. When properly coated and fabricated, it has extremely high tear-resistance, stands up under the roughest conditions of abrasion and weather—resists deterioration caused by oil, mildew and rot. But at the same time, Welkote-based materials are light, easier to handle in use, easy to work with in fabrication! Welkote is being widely specified by coaters for tarpaulins and protective coverings of all kinds. Supplied by Wellington Sears in three basic weights, it is one of many fabrics we engineer for the coating industry, developed through our century of serving the fabric needs of many industries. For further information about Welkote, or for help in solving any problem involving fabric in combination with rubber or plastics, call us. Put our experience to work for you. For informative booklet, "Modern Textiles for Industry," write Dept. G-3.



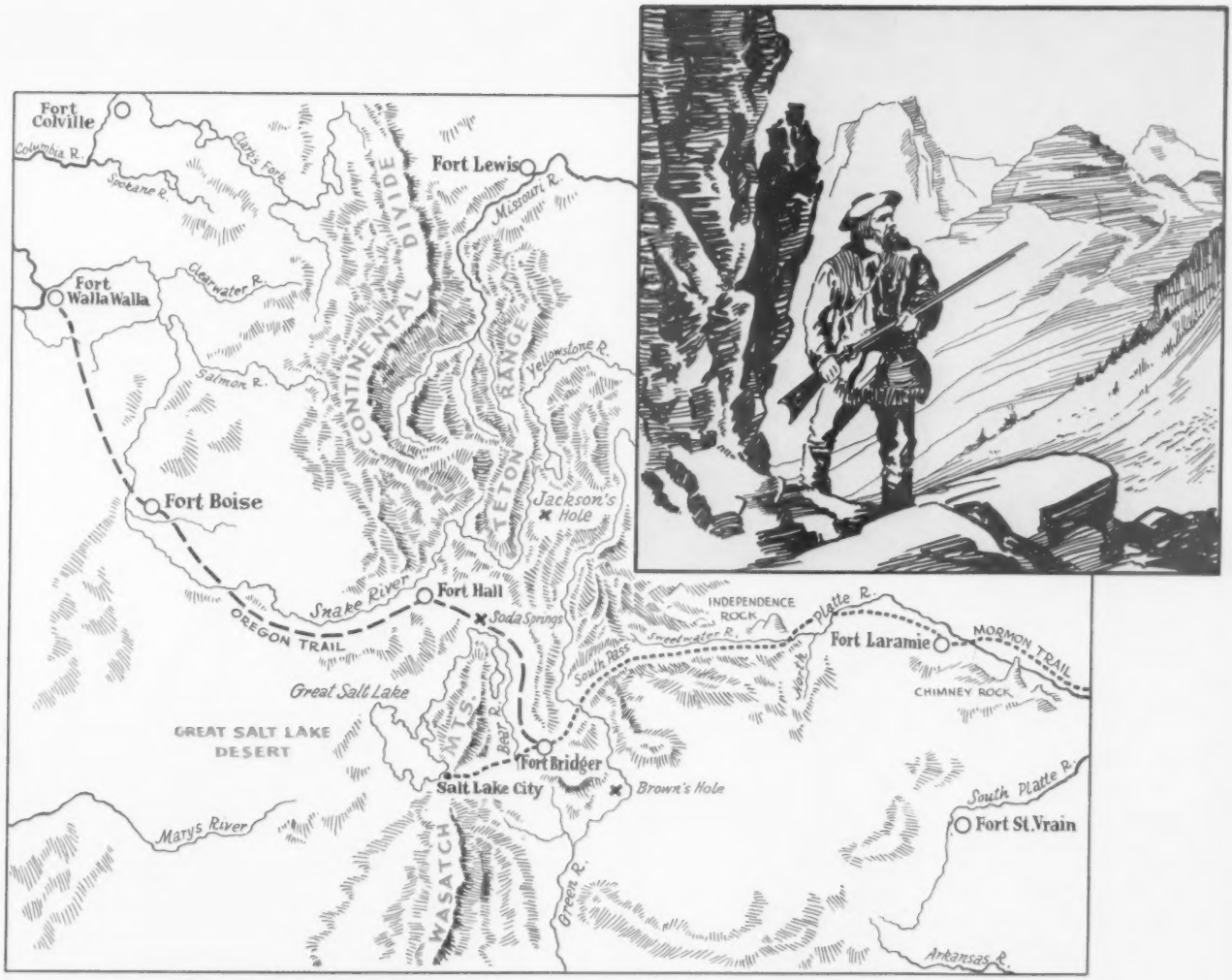
Wellington Sears

A Subsidiary of West Point Manufacturing Company

FIRST In Fabrics For Industry

For Mechanical Goods, Coated Materials, Tires, Footwear and Other Rubber Products

Wellington Sears Co., 65 Worth St., New York 13, N. Y. • Atlanta • Boston • Chicago • Dallas • Detroit • Los Angeles • Philadelphia • San Francisco • St. Louis



THE MOUNTAIN MAN . . . *The Pathfinder Of The West*

The principal commercial asset Lewis and Clark found immediately available in the Louisiana territory was an abundance of fur-bearing animals. This 'gold' of that particular period sent many brave and intrepid spirits to the Rocky Mountains. Called "Mountain Men," some worked for the large fur companies. But there were others who were free traders or trappers, accountable to no one, capable of enduring almost impossible hardships, as fearless as men could be, leading lives never free of danger. They were heroic figures, and fierce, dependent upon their own resourcefulness in unknown regions, completely cut off from the land and people they once knew.

An authority says that it was the roving trapper and solitary trader who first sought out the inhospitable wilds, traced the streams to their sources, scaled mountain passes, and explored a boundless expanse where the foot of the white man had never trod before. These were the men who first explored and established the routes of travel which are now and always will be the avenues of commerce in the western region. These were the pathfinders, men like Kit Carson, Jim Bridger, Bill Williams, the Bents, the Sublettes, Joe Meek, Jedidiah Smith, St. Vrain, Fitzpatrick and many others.

In every human endeavor there are the pathfinders. These are the ones who chart the highways of progress — men experimenting and observing out in the field; men at work in laboratories; men seeking and searching and finding out; men gaining and gathering knowledge. Though the methods and materials in the early manufacture of carbon black might seem crude today, for example, yet it was out of such a beginning that the great progress of the industry has come, the great benefits to transportation developed, and the modern tire created.

If a mountain man could stand on the rising slopes of the Rockies today and before him see the transcontinental highways teeming with motor vehicles, transporting man and his products, he might, and probably would say — using the language of his day: "for sartain, these are great doin's" . . . but he was the one who performed the "great doin's" in the first place.

United Carbon Company

KOSMOS 35

Kosmos 35 (GPF), general purpose furnace, is a remarkably versatile black with properties streamlined in keeping with today's demands.

Kosmos 35 was purposely developed to provide the easy mixing, fast processing, and increased reinforcement normally derived from the use of more than one type black.

Kosmos 35 has also other desirable features, such as high resiliency, low heat build-up, good flex resistance, and of course exceptional uniformity.

United blacks are quality blacks commanding confidence everywhere because they do such an excellent job.

For product recognition, specify United. You stand to gain so much.

UNITED CARBON COMPANY, INC.

A subsidiary of United Carbon Company

CHARLESTON 27, WEST VIRGINIA

NEW YORK AKRON CHICAGO BOSTON MEMPHIS

HEAT V LIGHT

HARSHAW VINYL STABILIZERS

for the vinyl plastic and coating industries

Important additives for processing and stabilizing clear and opaque vinyls—

CALENDERED FILMS AND SHEETS • EXTRUSIONS RIGIDS AND FLEXIBLE PLASTISOLS • ORGANOSOLS • COATINGS

CADMIUM 2-V-4

Leading heat and light stabilizer for clear or opaque stock, an organic liquid complex containing no disadvantageous soapy component. Unequalled for stabilizing against effects of sunlight or outdoor aging.

BARIUM-CADMIUM 128-V-5

Leading combination of coprecipitated laurates for outstanding performance, where lubricating advantages are required. Generally 30% more effective than common barium-cadmium laurates.

Write for a Vinyl Stabilizer Check List that you may use to detail as much as possible your particular requirements.

A practical stabilizing system will be suggested promptly, based on our experience with the various Vinyl Polymers and Copolymers and with the different Plasticizers, for your processing and product end-use requirements.

THE HARSHAW CHEMICAL CO.
CLEVELAND 6, OHIO

Best effects are attained for particular requirements by combining 2-V-4 or 128-V-5 in a stabilizing system with one or more of the following three stabilizers.

BARIUM 1-V-4

Compatible barium compound, minimum effect on viscosity. Permits processing at higher temperatures.

ORGANIC 8-V-1

Chelating agent, more than two times as effective as common organic phosphites. Inactivates harmful by-products to boost stability. Contributes to top clarity

ORGANIC 7-V-2

Epoxy assistant, highly effective HCl scrubbing agent, undiluted. Will extend stability for longer processing periods.

CADMIUM 28-V-2

For rigids, opaque to translucent. Stabilizes unplasticized resin efficiently and economically, with minimum effect on physical properties of product.

Stabilizing Systems developed for Harshaw Customers, for special processing and finished product properties, may contain one of the following stabilizers.

ZINC 9-V-1: Organic liquid complex containing no disadvantageous soapy component used in selected formulations.
CADMIUM 2-V-7: For modified solutions and organosols.
CADMIUM 24-V-1: Organic liquid complex for highest attainable clarity, used principally with dispersion resins.
CADMIUM 2-V-400: Modified 2-V-4.
CADMIUM 2-V-8: Selected laurate, used principally with low fusing resins.
BA-CD 12-V-5: Coprecipitated laurate.
CADMIUM 22-V-1: For rigid, clear and opaque stocks.
ORGANIC 7-V-1: Epoxy assistant.
ORGANIC 7-V-4: Epoxy assistant, for rigids.
BARIUM 1-V-3: Dispersible stearate, to contribute lubricity with barium effects.
BARIUM 1-V-6: For asbestos filled tile.
BARIUM 1-V-7: Liquid, for modified plastisols and organosols.
CALCIUM 5-V-1: Dispersible stearate, to contribute with calcium effects.
CALCIUM 5-V-22: Dispersible, low melting stearate to reduce internal friction.
ORGANIC 8-V-100: Modified 8-V-1.

look
it's
TITANOX®

Rutile types of TITANOX white titanium dioxide pigments are universally acceptable for most types of plastics—whether extruded, molded, sheet, or film-coated. For white and light tinted stocks, TITANOX-RA provides maximum whiteness, brightness and opacity. For heavily loaded stocks where the high opacity of "pure" titanium dioxide is not needed, TITANOX-RCHT or TITANOX-C-50 may be used.

But whatever the use, no other whitening agent gives plastic products the color and sparkle—the eye-catching appearance—that TITANOX does. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; Atlanta 5; Boston 6; Chicago 3; Cleveland 15; Houston 2; Los Angeles 22; Philadelphia 3; Pittsburgh 12; Portland 14, Ore.; San Francisco 7. In Canada: Canadian Titanium Pigments Limited, Montreal 2; Toronto 1.

Titanium Pigment Corporation is a subsidiary of National Lead Company

3646-A

A Specialty Elastomer with Extra-Special Properties

HYPALON® 20

OZONE–

No HYPALON product has ever been known to fail due to ozone attack. (See Reports 55-3, 55-5, BL-269.)

HEAT–

HYPALON products perform well at high temperatures. (See Reports 55-3, BL-262, BL-267, BL-306, BL-310.)

CORROSIVE CHEMICALS–

Exceptional resistance to acids and other strong oxidizing chemicals. (See Reports BL-258, BL-261, BL-267.)

SUNLIGHT–

Weatherability of HYPALON products is excellent. Brilliant colors stay bright. (See Reports BL-251, BL-274, BL-297, 55-5.)

Physical properties and processing are good . . .

E. I. du Pont de Nemours & Co. (Inc.)
Elastomers Division
DISTRICT OFFICES:

Akron 8, Ohio, 40 E. Buchtel Ave. . . . . POrtage 2-8461
Atlanta, Ga., 1261 Spring St., N. W. . . . . EMerson 5391
Boston 10, Mass., 140 Federal St. . . . . HAncock 6-1711
Charlotte 2, N. C., 427 West Fourth St. . . . . FRanklin 5-5561
Chicago 3, Ill., 7 South Dearborn St. . . . . ANdover 3-7000
Detroit 35, Mich., 13000 West 7-Mile Rd. . . . . UNiversity 4-1963
Houston 25, Texas, 1100 E. Holcombe Blvd. . . . . JAckson 8-1432
Los Angeles 58, Calif., 2930 E. 44th St. . . . . LOgan 5-6464
Trenton 8, N. J., 1750 North Olden Ave. . . . . EXport 3-7141

In Canada contact Du Pont Company of Canada Limited, Box 660, Montreal

Du Pont
HYPALON®
DU PONT
REG. U. S. PAT. OFF.
BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

The THROPP 60″ MILL

designed and built for

MAXIMUM EFFICIENCY–SUPERIOR PERFORMANCE –MINIMUM MAINTENANCE

This extra heavy duty 60″ streamlined mill is designed and built in every detail to provide dependable uninterrupted production under the rigorous service conditions encountered in the Rubber and Plastics Industries.

Built-in herringbone gear speed reducers, with anti-friction roller bearings, insure proper alignment with master gear and pinion at all times. Fully enclosed frames and guards keep cleaning and maintenance costs down.

Thropp 42″, 50″, 72″ and 84″ mills for the Rubber and Plastics Industries are also available.

SEND FOR FURTHER INFORMATION

Wm. R. THROPP & Sons

Division of J. M. LEHMANN COMPANY, Inc., 555 NEW YORK AVE., LYNDHURST, N. J.

Superior to **CHANNEL BLACKS**

Now at **CHANNEL BLACK** *Prices*

CABOT

Vulcan® 3 HAF

BEST QUALITY HIGH ABRASION FURNACE CARBON BLACK IN THE INDUSTRY

Vulcan 3, the best quality HAF in the carbon black industry, gives up to 20% superior tire mileage to channel blacks, plus better-than-channel black flex-cracking resistance, mixing time, processing, extrusion, die swell and rate of cure.

Vulcan 3 gives outstanding reinforcement, high abrasion resistance, excellent processing and good extrusion and is being used by the major rubber companies of the world in the production of tires, mechanical goods, insulated wire and in a wide range of rubber compounds where these properties are essential.

Available throughout the world for

POUNDS STERLING
CANADIAN DOLLARS
UNITED STATES DOLLARS

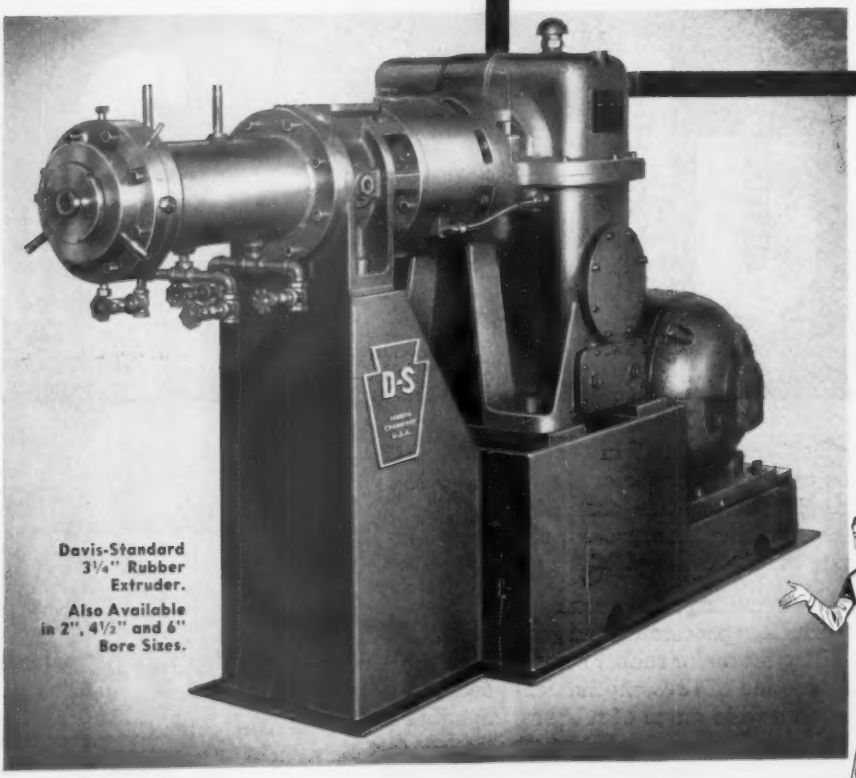
GODFREY L. CABOT, INC.

77 FRANKLIN STREET
BOSTON 10, MASS.

THOSE WHO PREFER *Quality* USE D-S MYSTIC CONNECTICUT U. S. A. EXTRUDERS

We at the Davis-Standard Sales Corporation are firm believers in the statement that "there is no substitute for quality". Although we do not claim this statement to be an official motto of our company, it could well be since every effort is made to produce only the highest quality extruders and wire machinery.

Davis-Standard's *complete* wire machinery line includes all the equipment required to handle all the steps involved in the insulation of wire. From pay-off to take-up, each operation is precisely timed and coordinated to produce the finest rubber insulation quickly and efficiently.



Davis-Standard 3¼" Rubber Extruder.
Also Available in 2", 4½" and 6" Bore Sizes.

The complete wire machinery line offered by Davis-Standard includes:

Rubber Extruders
Self-Braking Pay-Offs
Drag Capstans
Splice Boxes
Vulcanizing Tubes
Steam and Water Seals
Continuous Take-Ups
Pulling Capstans
Dancer Control Columns
Wire Measuring Machines

D-S MYSTIC CONNECTICUT U. S. A.

DAVIS-STANDARD
SALES CORPORATION

8 WATER STREET, MYSTIC, CONNECTICUT

SOLE SELLING AGENTS FOR . . . THE STANDARD MACHINERY COMPANY, World's Largest Manufacturers of Custom-Built Extruding Machines
IN EUROPE AND THE STERLING AREA, CONTACT FINNEY PRESSES LTD., BIRMINGHAM, ENGLAND

NOW IN OPERATION–GAF'S NEW PLANT FOR HIGH PRESSURE ACETYLENE DERIVATIVES

the story behind the headline

For those of you who have not been eating, sleeping and breathing high pressure acetylene reactions as we have, a brief reminder on the background of these products may be in order. In the early 1930's, Dr. J. Walter Reppe, working in Germany, licked the previously "impossible" problem of handling acetylene efficiently and safely at high temperatures and high pressures in chemical syntheses. This led him and his group into varied investigations which resulted in the synthesis of numerous chemicals which had previously been completely unknown, or at best only obtainable by elaborate and expensive reactions.

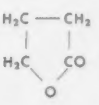
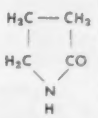
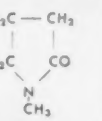
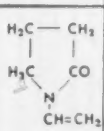
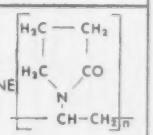
Even though widespread work in this field has continued steadily up to the present, and the laboratories of General Aniline in this country have been engaged in their own independent research for more than ten years, vast and challenging areas of research still remain for exploration in the new branch of chemistry involving high pressure acetylene reactions.

When the GAF laboratories began synthetic work in the new field, none of the products they turned out had ever been available in the U.S. in commercial volumes and at commercial prices. We, therefore, found it necessary to do some rather fancy, long-range extrapolating from the physical and chemical properties of all of the products to their potential applications and sales volumes in order to decide which would be of greatest immediate industrial value. Following these decisions came sales development, application research, and process development in the laboratory and pilot plant. Finally, the plant stage has been reached for the first group of products now to be made at GAF's new Calvert City plant.

They are a related series resulting from the reaction of acetylene with formaldehyde to yield a mixture of butynediol and propargyl alcohol. In a relatively brief time they have developed an astonishing and, we must confess, in part unexpected range of applications about which GAF's Commercial Development Department has told you in advertisements, data bulletins and personal visits. Along with the large new plant now also comes a new, full-scale sales department eager to help you use these products to your best advantage.

We expect to be reporting the commercialization of many more high pressure acetylene derivatives in the future, but no announcement will have quite the significance of this first one, both for you and for us. We believe it represents a milestone for our industry: the first of many commercial high pressure acetylene derivatives plants in the United States.

PRODUCTS TO BE AVAILABLE FROM GAF's NEW PLANT AT CALVERT CITY, KENTUCKY:

PROPARGYL ALCOHOL $HC{\equiv}CCH_2OH$	2-BUTYNE-1,4-DIOL $HOCH_2C{\equiv}CCH_2OH$
1,4-BUTANEDIOL $HOCH_2CH_2CH_2CH_2OH$	BUTYRO-LACTONE 
2-PYRROLIDONE 	N-METHYL-2-PYRROLIDONE 
N-VINYL-2-PYRROLIDONE 	POLYVINYL-PYRROLIDONE (PVP) 

For technical information, price schedules and samples write to:

ACETYLENE CHEMICALS DEPARTMENT
ANTARA® CHEMICALS
A SALES DIVISION OF
GENERAL ANILINE & FILM CORPORATION
435 HUDSON STREET · NEW YORK 14, NEW YORK

ANTARA
gaf

From Research to Reality

Natural Rubber . . . GR-S . . . Buna N . . . Silicones . . . Polyethylene? The above could be any of them or one of many other polymers, when versatile Di-cup is used as the curing agent.

DI-CUP* A NEW "CURE-ALL" FOR POLYMERS?

Coming off a curing press, this slab could be any of a number of materials that can be economically and efficiently cured with new Hercules Di-cup (dicumyl peroxide).

The first new widely applicable method of curing without sulfur or a sulfur-containing compound to be developed in 117 years, Di-cup produces carbon-to-carbon cross linking that makes it practically a "cure-all" for polymers.

Di-cup is a stable peroxide of low volatility. Economical to use, Di-cup vulcanizates exhibit good aging, good low temperature performance, and low compression set. White stock is not discolored and good color retention is obtained. Silicones cured with Di-cup are free of gas bubbles and acidic by-products.

Why not learn more about this new curing agent? Write to Hercules for additional data and information on available commercial forms.

Naval Stores Department

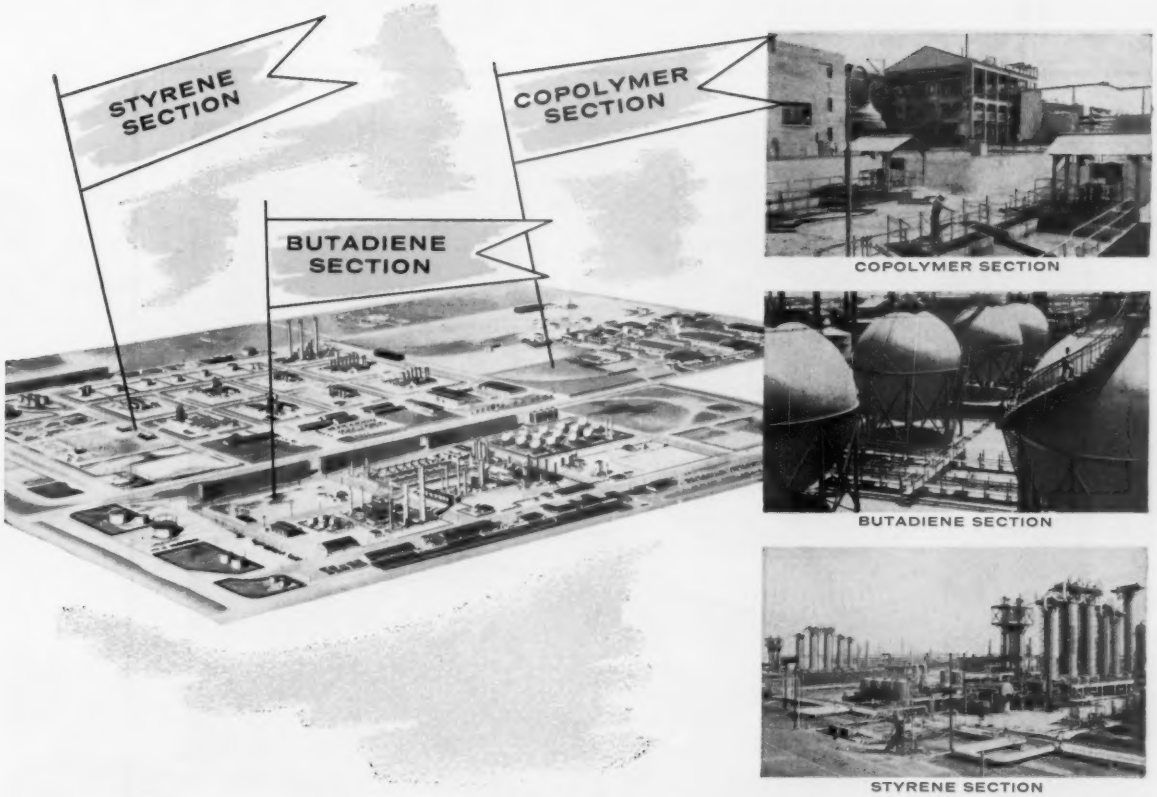
HERCULES POWDER COMPANY

INCORPORATED

918 Market St., Wilmington 99, Delaware

*Hercules trademark

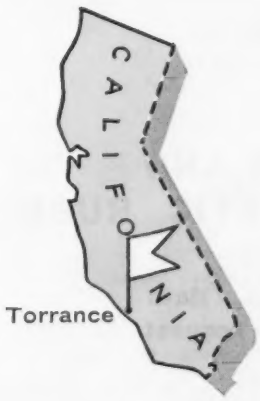
N056-1



In the West...

Here's the handy source of

Synthetic Rubber



Shell Chemical offers a wide line of general-purpose polymers

Torrance, California, deserves a big star on your map of rubber sources. It's the home of Shell Chemical's synthetic rubber plant . . . one of the nation's best equipped for the production of a variety of types of butadiene-styrene rubber.

Whether you need a bale or a carload . . . for sheeting, molded goods, extruded goods, tires or other uses, Shell Chemical can fill your requirements.

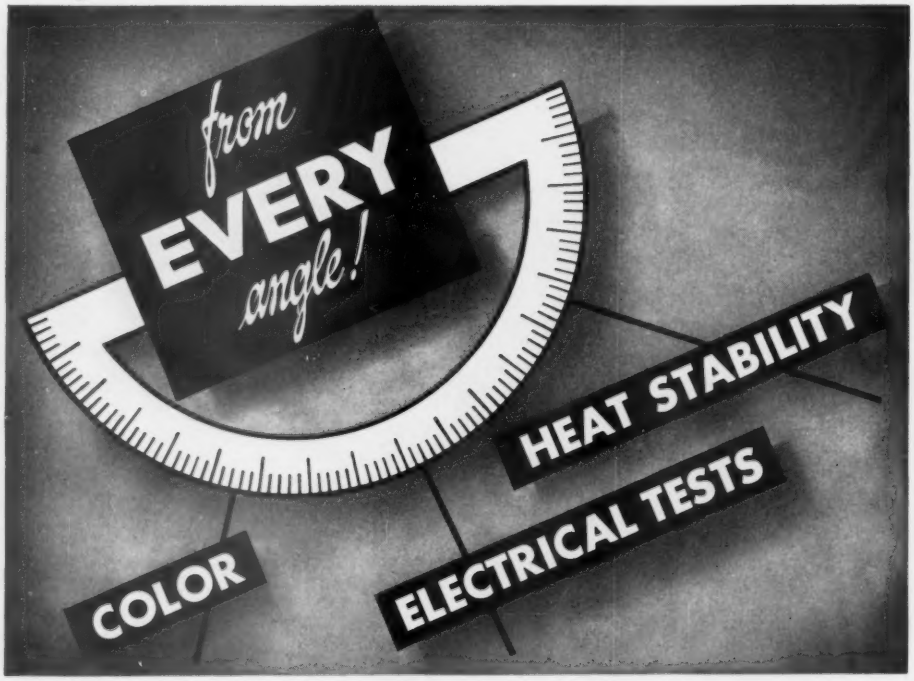
Our technical staff will be glad to discuss your needs. Phone or write Synthetic Rubber Sales Division, P.O. Box 216, Torrance, California. Phone FAculty 1-3710 or DAvis 4-4991.

SHELL CHEMICAL CORPORATION

Synthetic Rubber Sales Division

P. O. Box 216, Torrance, California

SHELL



PIGMENT NO. 33

for Compounding

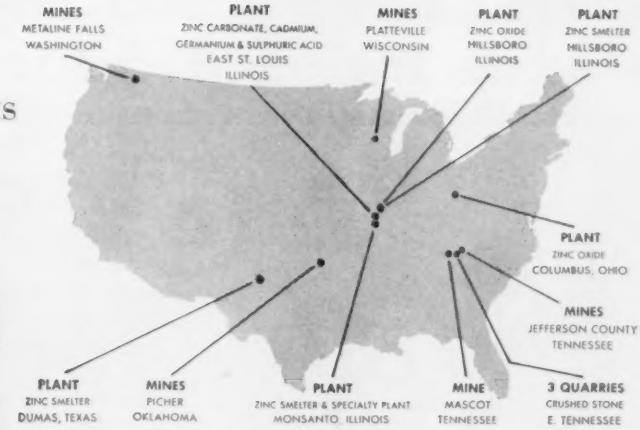
VINYLS AND SYNTHETIC RUBBER

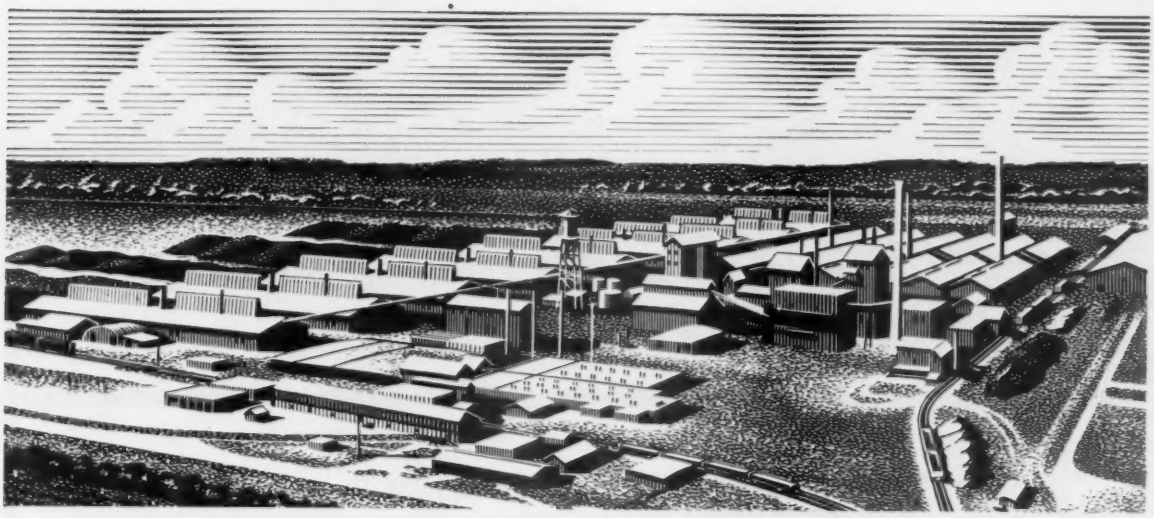
Sample and technical data sent promptly on request

SOUTHERN CLAYS, Inc.

33 RECTOR STREET
NEW YORK 6, N. Y.

American Zinc and its products *from* A *to* Z





SMELTER AT DUMAS, TEXAS

Dumas is one of the larger horizontal retort furnace plants in the United States. Here are produced Prime Western, Select, Brass Special and Intermediate grades of slab zinc for the galvanizing and brass industries. Roasting and sintering operations are also carried on at Dumas, making this plant an important factor in the widespread American Zinc picture.

PRODUCERS OF

ALL GRADES OF SLAB ZINC
ZINC ANODES (Plating & Galvanic)
METALLIC CADMIUM
SULPHURIC ACID
LEAD-FREE and LEADED ZINC OXIDES
ZINC CARBONATE
GERMANIUM DIOXIDE
AGRICULTURAL LIMESTONE
CRUSHED STONE

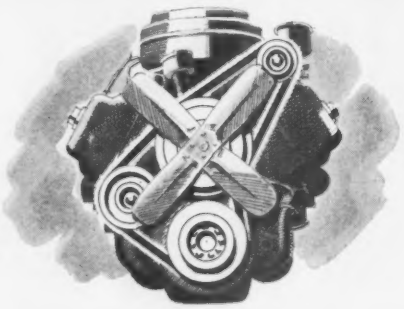
Distributors for

American Zinc sales Company

AMERICAN ZINC, LEAD & SMELTING COMPANY

Columbus, Ohio • Chicago • St. Louis • New York • Detroit • Pittsburgh

FORTISAN* 36 RAYON FIBER
makes these products STRONGER



V-BELTS. These vital power transmitters gain extra life when reinforced with Celanese FORTISAN-36. After extra long wear stretch is negligible. It won't expand or contract under normal V-Belt operating conditions so as to affect the belt's efficiency. This is because it's dimensionally stable. FORTISAN-36 is far stronger than conventional fibers, imparts higher tensile strength. That's why V-belts with FORTISAN-36 are now being used as original equipment on automatic washers, power mowers, trucks, passenger cars and farm tractors.

HIGH-PRESSURE FIRE HOSE. Used as filler cord in interior and exterior jackets of high-pressure fire hose, FORTISAN-36 pays off in a lighter but stronger hose that's more flexible, easier to handle and rack, and more heat-resistant. Also, it saves space because it folds tighter. FORTISAN-36 saves money in processing since it need not be heat-stretched.

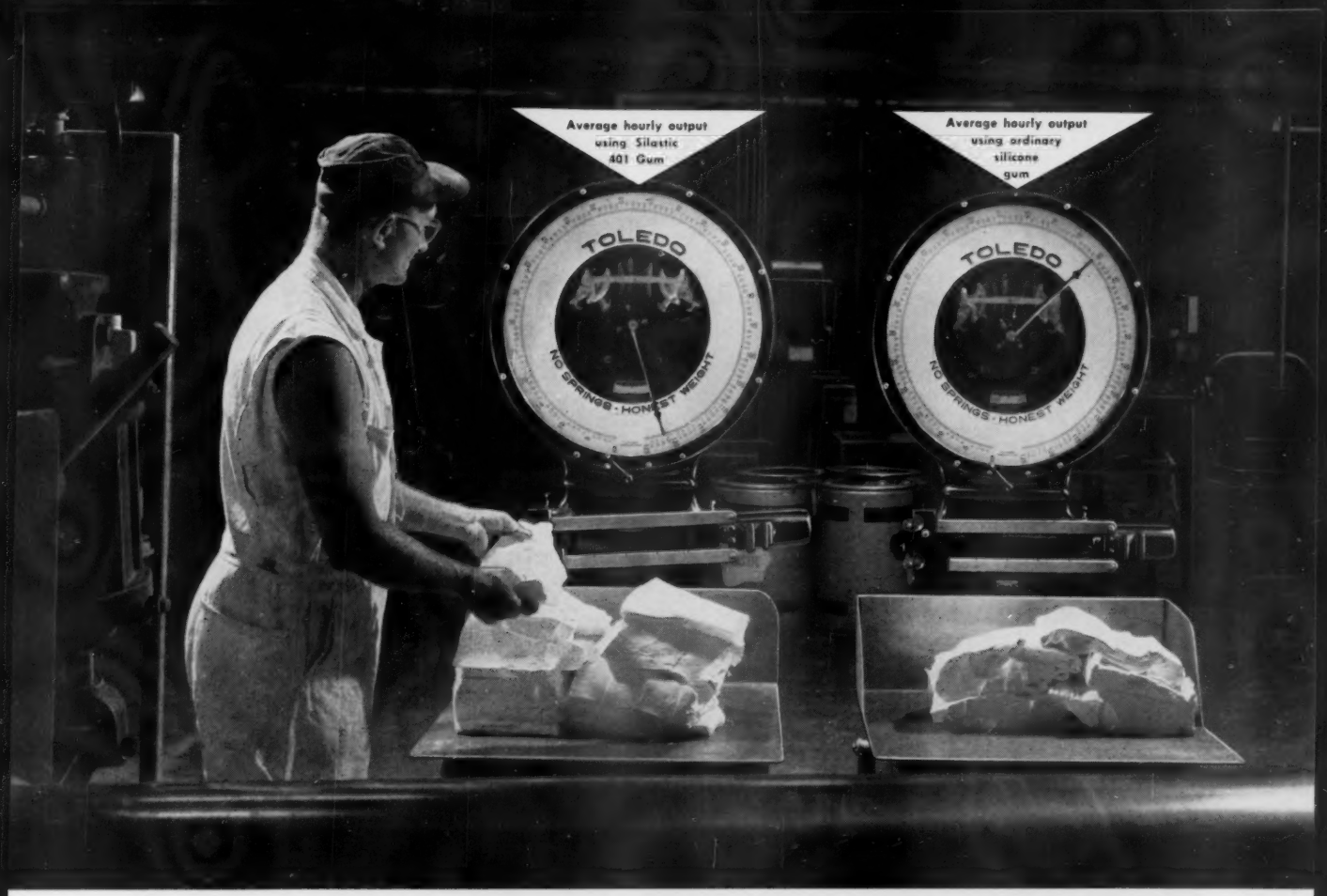
HIGH-PRESSURE HOSE. High tensile strength, remarkable stretch-resistance and nearly perfect dimensional stability make FORTISAN-36 first choice for many types of high pressure hose. It produces a hose that's lighter, safer, more flexible and capable of taking extreme pressures easily. Hose of FORTISAN-36 appear likely to do a better job in aircraft controls, hydraulic presses, power feeds, trucks, greasing tools, road-building equipment.

FORTISAN-36 IS GOING PLACES! Besides these applications, this new Celanese high-tenacity, heavy-duty rayon of saponified acetate has practical application for truck tires, plastic laminates, filters, paper reinforcement, tarpaulins and webbing. Let us show you how it can improve your product. Write for booklet TD20A to Celanese Corporation of America, Industrial Sales Dept., Textile Division, Charlotte, N. C. Branch offices: 180 Madison Ave., N. Y. 16; Pilgrim Sq. Building, 9 Overwood Rd. at W. Market St., Akron 13, Ohio (Tel.: TE 6-2392). *Reg. U.S. Pat. Off.

Celanese

FIBERS FOR INDUSTRY

FORTISAN* RAYON · FORTISAN*-36 RAYON · ARNEL* TRIACETATE · ACETATE · VISCOSE-RAYON


Average hourly output using Silastic 401 Gum
TOLEDO
NO SPRINGS - HONEST WEIGHT
Average hourly output using ordinary silicone gum
TOLEDO
NO SPRINGS - HONEST WEIGHT

SILASTIC 401 GUM

increases mill output 30%... reduces production costs!

Silastic 401 gum is easier to mill than other silicone rubber gums.* In actual production timing tests, a mill produced 122 pounds of stock per hour using Silastic 401 Gum versus 79 pounds using a conventional silicone gum. By reducing compounding time, *Silastic 401 Gum* assures more efficient use of your mills and saves capital investment in extra equipment. Furthermore, stocks compounded of *Silastic Gums* are exceptionally easy to mold and extrude. So, from every standpoint, *Silastic Gums* give you easier, faster processing and lower over-all production costs.

Remember, too — Dow Corning's 10 years of experience in compounding silicone rubber is at your service . . . either in the field or at Midland, Michigan, where you are invited to see for yourself the speed and results of compounding with *Silastic Gums.*

These Silastic PROPERTIES mean better products... *Low compression set without toxic additives. Serviceable at temperatures ranging from —100 F to 500 F. Withstands weathering, ozone, corona. An ideal dielectric material. Can be compounded for high tensile strength.*

Your source for all silicone RESEARCH materials... *Dow Corning offers the most complete line of silicone rubber gums to be found — sulphur vulcanizing, peroxide vulcanizing, and fluid types. They're always available in sample quantities . . . and new types are being developed constantly!*

*TM REG. U. S. PAT. OFF.

first in silicones

DOW CORNING CORPORATION

MIDLAND, MICHIGAN

Send this coupon today for additional information, FREE samples!

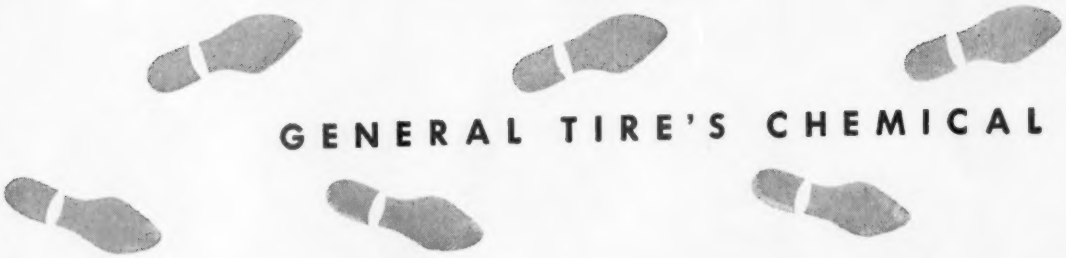
Dow Corning Corporation
Midland, Mich., Dept. 9203

Please send me ☐ additional information ☐ free samples of Dow Corning Silastic 401 Gum.

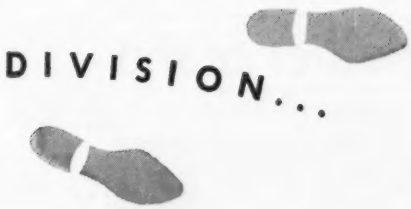
Name_____ Title_____

Company_____

Address_____



GENERAL TIRE'S CHEMICAL



Announces

A *NEW* EASY PROCESSING HIGH-STYRENE RESIN

Hystron

Hystron is easy processing, free-flowing and low dusting. The particles of Hystron disintegrate immediately upon contact with a mixing batch. Because of this unique characteristic of Hystron, pre-fusion is avoided and thorough, fast dispersion is assured.

Try it in shoe-soling, athletic goods, luggage and other nuclear applications. Obtain samples and literature from Harwick Standard Chemical Company, Akron, Boston, Trenton, Chicago, Albertville (Ala.).

THE GENERAL TIRE & RUBBER COMPANY
Chemical Division, Akron, Ohio

AVISCO RAYON, the "muscles" in this beltroad, is produced in a wider range of high-strength yarns than any other brand

American Viscose Corporation produces a wider range of both high-strength staple and filament yarns than any other manufacturer.

Avisco Rayflex yarn, standard Avisco 2200 denier tire yarn, Super Rayflex yarn, and Viscose 32-A high-strength rayon staple are also preferred by users because of three important factors:

1—their superior strength and durability

2—their dimensional stability in processing

3—the thorough, professional service offered by American Viscose representatives

Indeed, the excellence of Avisco fiber research, production and marketing knowledge is why so many leading American industries GROW WITH AVISCO rayon.

AVISCO®

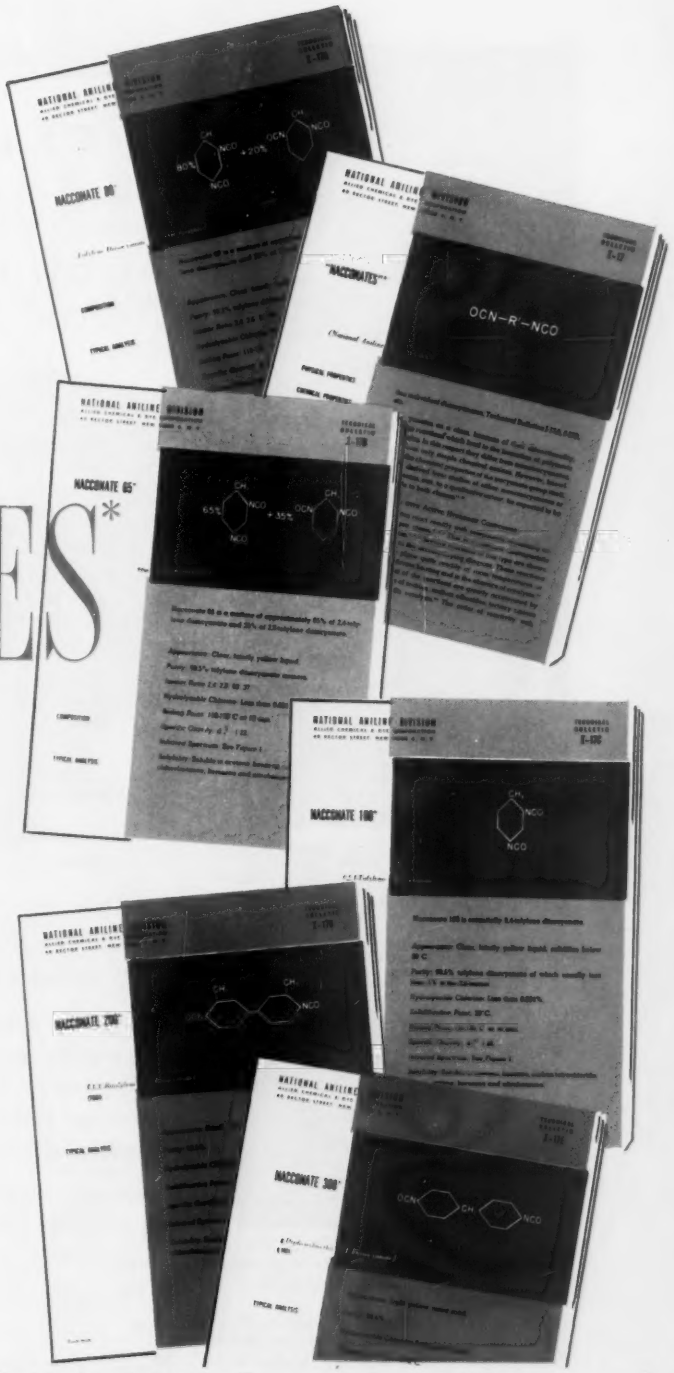
Perhaps you would like to know how you can grow with the products and services of the nation's leading producer of rayon.

Just write: American Viscose Corporation
350 Fifth Avenue
New York 1, N. Y.

NOW from National Aniline

Comprehensive Product-Data on Tolylene Diisocyanates

NATIONAL NACCONATES*



To encourage further exploration and application of these versatile polymer-forming intermediates, we now offer a comprehensive "product-data package" on National NACCONATES. This new data comprises a basic technical brochure on diisocyanates plus five technical bulletins, viz

Bulletin I-17—"NACCONATES" contains 24 pages of fundamental data on diisocyanates as a class, including 12-pages covering 27 principal generic reactions (with amines, hydrazines, alcohols, carboxylic acids, etc., etc.) ; 8 pages of suggested uses plus a bibliography of 132 literature references applying thereto. Literally, it is a condensed, timely textbook for research and product development men.

Bulletin I-17A—NACCONATE 80 Four pages of specific data on National Aniline's mixture of approximately 80% of 2,4-tolylene diisocyanate and 20% of 2,6-tolylene diisocyanate. This bulletin includes properties, suggested uses, physiological data and a significant infrared spectogram on NACCONATE 80.

Bulletin I-17B—NACCONATE 65 includes data on National's mixture of approximately 65% of 2,4-tolylene diisocyanate and 35% of 2,6-tolylene diisocyanate.

Bulletin I-17C—NACCONATE 100 gives corresponding product data on National's 2,4-tolylene diisocyanate.

Bulletin I-17D—NACCONATE 200 covers National's 3,3′-bitolylene 4,4′-diisocyanate.

Bulletin I-17E—NACCONATE 300 covers National's diphenylmethane 4,4′diisocyanate.

NATIONAL ANILINE DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET, NEW YORK 6, N. Y.

Boston Providence Philadelphia Chicago San Francisco Portland, Ore. Greensboro Charlotte Richmond Atlanta Los Angeles Columbus, Ga. New Orleans Chattanooga Toronto

Allied Chemical

In view of our desire to handle requests in the order of their urgency, we ask that you fill out the coupon and attach it to your Company's letterhead.

Please send your 6 technical bulletins on NACCONATES. I am

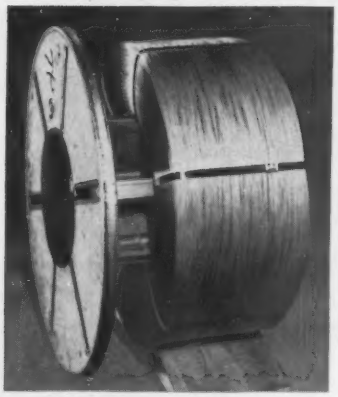
- ☐ now working with diisocyanates.
- ☐ working in areas where diisocyanates may have applications
- ☐ broadly interested in background data on diisocyanates.

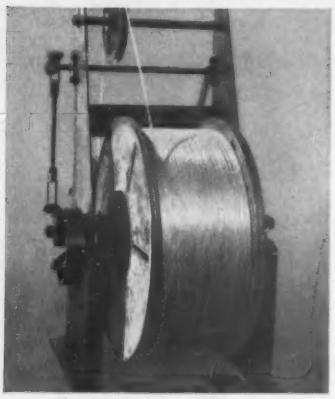
Name: _____

Position: _____

Company: _____

Address: _____





Pneumatic coil lifter positioning reelless coil over saddle block prior to removal of paper wrap and assembly of let-off reel.*

Partly assembled pneumatic let-off reel. Note provision for removal of steel strapping and easy assembly of reel to coil on saddle block.*

Completely assembled reel with bead wire coil mounted on conventional let-off stand.

*Patents Pending

National-Standard announces

REELLESS BEAD WIRE HANDLING

from mill to tire production!

Here is a new development worked out by National-Standard that is already saving *big* money in various tire plants.

A keynote of the development is a specially engineered pneumatic reel easily and quickly assembled to bead wire coils at the point of use. Highly important, it assures uniform flange pressure throughout the pay-off, eliminating kinking and breaking, preventing shutdowns, and improving production.

Moreover, this point-of-use reel permits bead wire to be shipped, stored and handled in reelless, palletized unit loads. This means a fraction of the usual tare, no reels to return, storage of more wire in a given area, easier, faster handling and improved access to wire for inventory turnover.

There are still other important gains. We'll be glad to give you complete details and estimate the savings that can be shown in your particular operations. Just say when.

NS NATIONAL-STANDARD Company NILES, MICHIGAN

NATIONAL-STANDARD COMPANY • NILES, MICHIGAN
Tire Wire, Stainless, Fabricated Braids and Tape
ATHENIA STEEL DIVISION • CLIFTON, N. J.
Flat, High Carbon, Cold Rolled Spring Steel
REYNOLDS WIRE DIVISION • DIXON, ILLINOIS
Industrial Wire Cloth
WAGNER LITHO MACHINERY DIVISION • JERSEY CITY, N. J.
Special Machinery for Metal Decorating
WORCESTER WIRE WORKS DIVISION • WORCESTER, MASS.
Round and Shaped Steel Wire, Small Sizes

Philprene®

TECHNICAL NEWS

ITEM NO. 2

Oil-extended Rubbers... Staining and Non-staining Types

Oil-extended rubbers can be divided into two general categories . . . the staining and the non-staining (or very slightly staining) types. The former contain aromatic oils and staining antioxidants. The non-staining types contain naphthenic oils and non-staining stabilizers. The two types of oil-extended cold rubbers are different in physical properties.

If staining is not a primary consideration, there are advantages to be gained by using the staining types. For example, PHILPRENES 1706 and 1712 . . . made with Philrich® 5 oil and staining antioxidants . . . possess lower modulus, equal or better tensile strength, greater elongation originally and after aging, and better tear resistance than the comparable non-staining PHILPRENES 1703 and 1708. The effect of the oil level is also illustrated by the data below.

Complete Technical Service

Phillips years of experience in the rubber field and Phillips continuing research in compounding and processing can be of definite value to you. Our technical representative will be glad to be of service. Consult him about your particular rubber problem.

Compounding Recipes

	Philprene 1703 1706	Philprene 1708 1712
Polymer	125	137.5
Philblack® O	62.5	68.75
Zinc Oxide	5	5
Stearic Acid	2	2
Sulfur	1.75	2
Santocure	1.2	1.2
DPG	—	0.1

SUMMARY OF PHYSICAL PROPERTIES

PHILPRENE	1703	1706	1708	1712
CURE: 30 MINUTES AT 307°F				
PHR Oil	25	25	37.5	37.5
Oil Type	Naphthenic	Philrich 5	Naphthenic	Philrich 5
Antioxidant	Non-Staining	Staining	Non-Staining	Staining
Mooney ML-4	62	64	64	61
300% Modulus, psi	1960	1800	1925	1575
Tensile, psi	3400	3450	3225	3180
Elongation, %	455	530	450	535
Shore Hardness	63	66	61	61
Tear Strength, Lbs/in.	215	268	198	269
Tear Strength, at 212°F, Lbs/in.	167	211	166	215
Compression Set, %	21.8	18.3	24.5	21.1
Heat Buildup, T°F	54.5	58.5	52.5	56
OVEN AGED 70 HOURS AT 212°F				
300% Modulus, psi	—	2800	—	2520
Tensile, psi	2825	2880	2510	2600
Elongation, %	265	310	245	310
Shore Hardness	72	75	72	71

PHILLIPS CHEMICAL COMPANY
Rubber Chemicals Division
318 Water Street, Akron 8, Ohio
District Offices: Chicago, Providence and Trenton

"Tumbling with Pureco liquid CO_2 eliminated die-trimming on several product lines...

and saves 3-4 hours in deflashing time", says P. W. Floeckher, Canfield Rubber Co., Bridgeport, Conn.

"Previously we would first die trim rubber parts and then finish tumble them in a barrel with Pureco "DRY-ICE". Results were good, but required time to complete. Recently we experimented with Pureco liquid CO_2. The results far surpassed our expectations. Parts which used to be die trimmed in 3 to 4 hours can now be fully trimmed in minutes.

"Quite naturally we cannot trim all our items in this manner. Nevertheless, we have found several where die trimming can be eliminated entirely."

Your Pureco man can help you discover how a "frozen" rubber tumbling technique can give you better results with savings in time, material and manpower. He can arrange for an actual demonstration in your plant. Or, he can take some of your "problem" parts to experts at the Pureco laboratories. You'll receive a confidential report on the tumbling technique that will do the best job for you.

Either way, there's no cost or obligation. Call in your Pureco man as soon as possible!

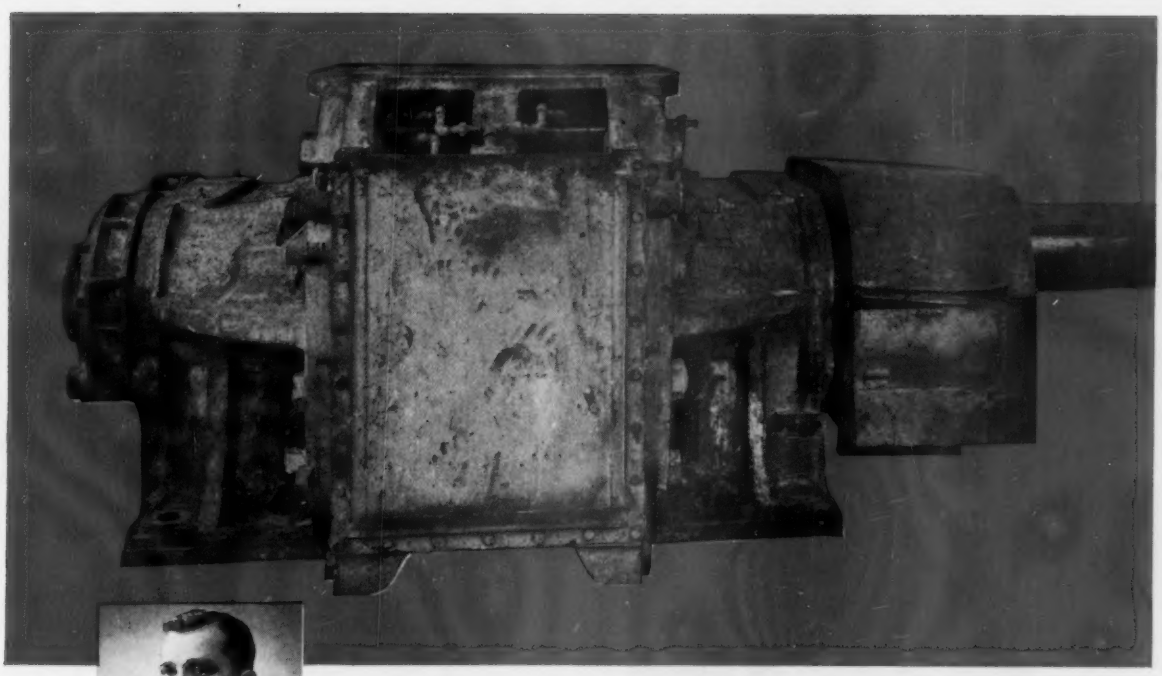
PURECO CO_2

Pure Carbonic Company

NATIONWIDE "DRY-ICE" SERVICE-DISTRIBUTING STATIONS IN PRINCIPAL CITIES

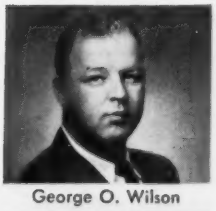
GENERAL OFFICES: 60 EAST 42ND STREET, NEW YORK 17, N. Y.

PURE CARBONIC COMPANY is a division of **AIR REDUCTION COMPANY, INCORPORATED** • Principal products of other divisions include: **AIRCO** — industrial gases, welding and cutting equipment and acetylenic chemicals • **OHIO** — medical gases and hospital equipment • **NATIONAL CARBIDE** — pipeline acetylene and calcium carbide • **COLTON** — polyvinyl acetates, alcohols and other synthetic resins.



Walter D. Taylor

Richard E. Baker, Jr.



George O. Wilson

Alfred W. Marsch

Edward H. Shortell

When your Banbury® mixer is ailing–

CALL THE DOCTOR!

When you are ill, you call in a doctor—a man you know has the *ability* and *experience* to diagnose your ailment and prescribe a cure. Or, instead of waiting for illness to strike, you see your doctor for periodic checkups to forestall trouble.

Why not follow one of these procedures with your Banbury mixers? If a machine is "ill," call in a man with the *ability* and *experience* to tell you what is wrong and how it can be remedied — quickly and surely. Better still, schedule your Banburys for regular examinations to avoid trouble.

The photos show five such "doctors" — and all Farrel-Birmingham service engineers. Between them they have had 88 years of experience in the "anatomy" of the Banbury mixer. They are all specialists in prescribing sound preventive maintenance, or lasting cures for trouble that may have developed.

It will pay you to have one of these men make a "no-charge" checkup of your Banburys. Just contact one of the offices listed below.

FARREL-BIRMINGHAM COMPANY, INC.

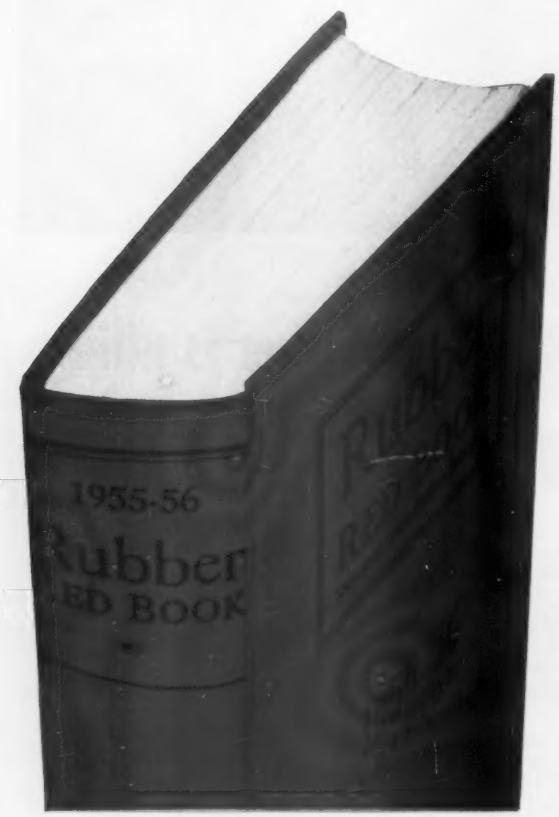
ANSONIA, CONN. (REgent 4-3331)
AKRON 8, OHIO, 2710 First National Tower (POrtage 2-8871)
CHICAGO 3, ILL., 120 South La Salle Street (ANdover 3-6434)
LOS ANGELES 21, CAL., 2032 Santa Fe Ave. (LUdlow 5-3017)
HOUSTON 2, TEXAS, 860A M&M Building (CApitol 2-6242)
FAYETTEVILLE, N. C., P. O. Box 3157 (3-0353)

Farrel-Birmingham®

FB-1064

Announcing the 1955-56 Edition of the

RUBBER RED BOOK



1955-56 Edition **Tenth Issue**
1250 Pages **Cloth Bound**

•

PRICE: $10.00 postpaid

Now Available — the 1955-56 RUBBER RED BOOK — the *Directory of the Rubber Industry* — the biggest (1250 pages) and most complete ever published!

Up-to-the-minute data reflecting the growth of the rubber industry. This edition features an expanded section on synthetic rubbers and rubberlike materials in keeping with the recent transfer of the synthetic rubber industry to private hands.

The 1955-56 Edition is divided into three sections:

I. RUBBER MANUFACTURERS—with personnel, products manufactured, and a geographical breakdown of rubber plants.

II. SUPPLIERS—complete product classifications for machinery, chemicals, fabrics and textiles, rubber (all types, including reclaim and scrap), latex, etc., with full names and addresses.

III. WHO'S WHO—*the* complete listing of all persons in the rubber industry together with their company connections, title and full address.

Other sections offer valuable information on consulting technologists, sales agents and branch offices, educational courses in rubber chemistry and technology now being offered, technical journals, trade and technical organizations, and much more.

The RUBBER RED BOOK has become, through the years, the most widely-used book in the rubber industry. Without doubt, it is *the* indispensable tool of the industry!

RUBBER AGE

101 West 31st Street, New York 1, N. Y.

Summary of Contents

1955-56 RUBBER RED BOOK

RUBBER MANUFACTURERS IN THE UNITED STATES
- Alphabetical Section
- Classified List of Rubber Products
- Geographical Section

RUBBER MANUFACTURERS IN CANADA

RUBBER MACHINERY AND EQUIPMENT
- Classified List of Machinery
- Machinery Manufacturers and Addresses

LABORATORY AND TESTING EQUIPMENT
- Classified List
- Suppliers and Addresses

ACCESSORIES AND FITTINGS
- Classified List of Products
- Suppliers and Addresses

RUBBER CHEMICALS AND COMPOUNDING MATERIALS
- Classified List of Materials
- Trade and Brand Names
- Suppliers and Addresses

FABRICS AND TEXTILES
- Classified List of Materials
- Suppliers and Addresses

NATURAL RUBBER AND RELATED MATERIALS
- Classified List
- Suppliers and Addresses
- Official Natural Rubber Type Descriptions

SYNTHETIC RUBBER
- Manufacturers of Synthetic Rubber
- Synthetic Rubbers by Type
- Other Rubberlike Materials by Type
- Suppliers of Butadiene and Styrene

RECLAIMED RUBBER
- Manufacturers and Addresses
- Brand Names and Trade Designations
- Classified By Application
- Classified By Color

SCRAP RUBBER AND PLASTICS
- Scrap Rubber Types
- Suppliers and Addresses

LATEX AND RELATED MATERIALS
- Latex and Latex Compounds
- Water Dispersions
- Plastisols and Organosols
- Miscellaneous
- Latex Compounding Materials
- Latex Machinery and Equipment
- Suppliers and Addresses

MISCELLANEOUS PRODUCTS AND SERVICES

CONSULTING TECHNOLOGISTS

SALES AGENTS AND BRANCH OFFICES

EXPORT AGENTS

EDUCATIONAL COURSES IN RUBBER CHEMISTRY AND TECHNOLOGY

TRADE AND TECHNICAL ORGANIZATIONS

TECHNICAL JOURNALS

WHO'S WHO IN THE RUBBER INDUSTRY

SUBJECT INDEX

TO ORDER the 1955-56 RUBBER RED BOOK Use This Order Blank or Send in Your Own Purchase Order

.....1956

RUBBER AGE
101 West 31st St., New York 1, N. Y.

Please send to the undersigned ..... copies of the 1955-56 RUBBER RED BOOK @ $10.00* each.

☐ Remittance of $..... is enclosed

☐ Send invoice.

NAME _____

ADDRESS _____

_____

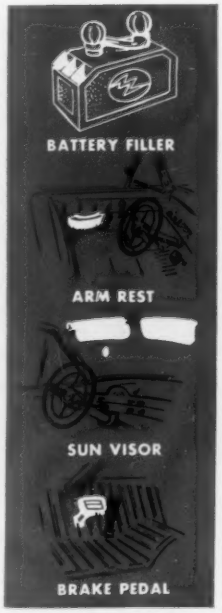
(*) Add 3% (30c) Sales Tax for copies sent to New York City addresses.

Plastisol

These illustrations may spark a new sales development or product improvement for you.

Toughness, chemical resistance, wear resistance, tear strength and flexibility make these compounds outstanding as noise deadeners, wire coatings, flexible molded parts, textile coatings, sealing compounds, glove coatings and in many other applications.

If your product requires a soft plastic coating or a molded part you should consider the use of vinyl plastisols.



"Best Known Name In Plastisol"

Watson-Standard Co.

225 Galveston Ave., Pittsburgh 30, Pa.

NEW YORK OFFICE: 15 Park Row, New York 38, N. Y.

CHICAGO OFFICE: 55 E. Washington Street, Chicago 2, Ill.

PLASTICS • INDUSTRIAL FINISHES • CHEMICALS

Make BIG SAVINGS

Have Your Rubber Molds Processed With . . . KORBET

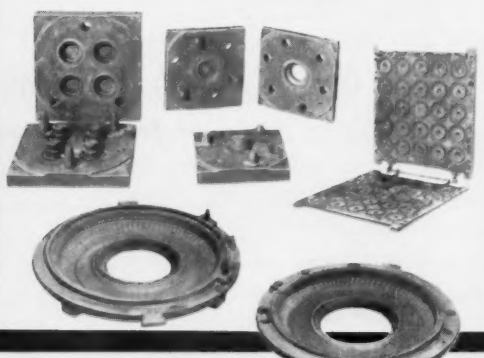
IMPROVES RELEASE TREATMENT

U.S. PAT. PEND.

1. Improves Mold Release
2. Reduces Mold Cleaning
3. Increases Production
4. Minimizes Rejects
5. Eliminates Costly Mold Downtime

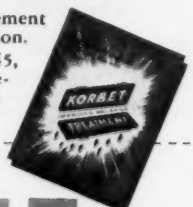
Write us about your steel mold production problems

TYPICAL KORBET TREATED MOLDS



A Korbet Treatment by absorbing lubricant in cavity surfaces will show you a tremendous improvement in mold release and decrease in rejection.

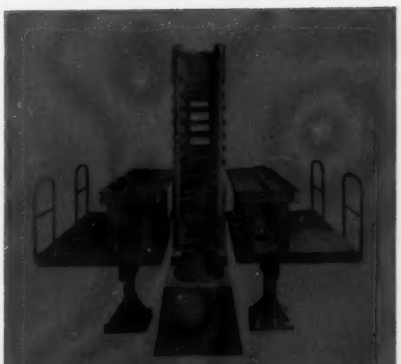
FREE! Write for Bulletin T-45, which completely describes the advantages obtained from a Korbet mold release Treatment.



KORBET CORPORATION

877 Addison Road • Cleveland 3, Ohio

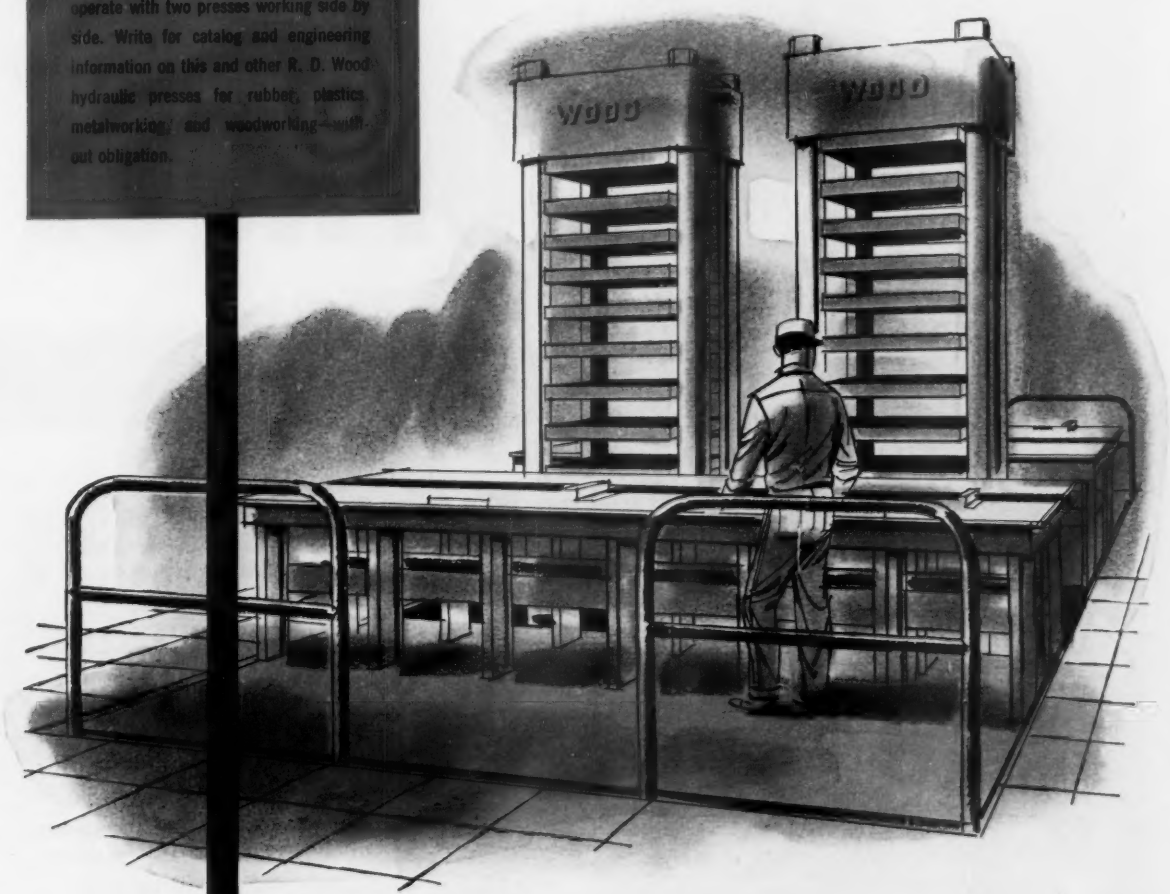
Telephone: EXpress 1-4872 or EXpress 1-4548



192-ton Multiple Opening Platen Press. Designed for molding rubber products. This press may be operated from an individual self-contained pumping unit or a central accumulator system. Two elevators operate with two presses working side by side. Write for catalog and engineering information on this and other R. D. Wood hydraulic presses for rubber, plastics, metalworking, and woodworking—without obligation.

The nameplate is your guarantee of value

When you buy an R. D. Wood press, you can take *full value* for granted. In more than 150 years, the R. D. Wood nameplate has never appeared on a product of inferior quality. It is your guarantee of sound design, premium materials, superlative craftsmanship. It is your assurance also of smooth, trouble-free performance, high productivity, long life and production economies.

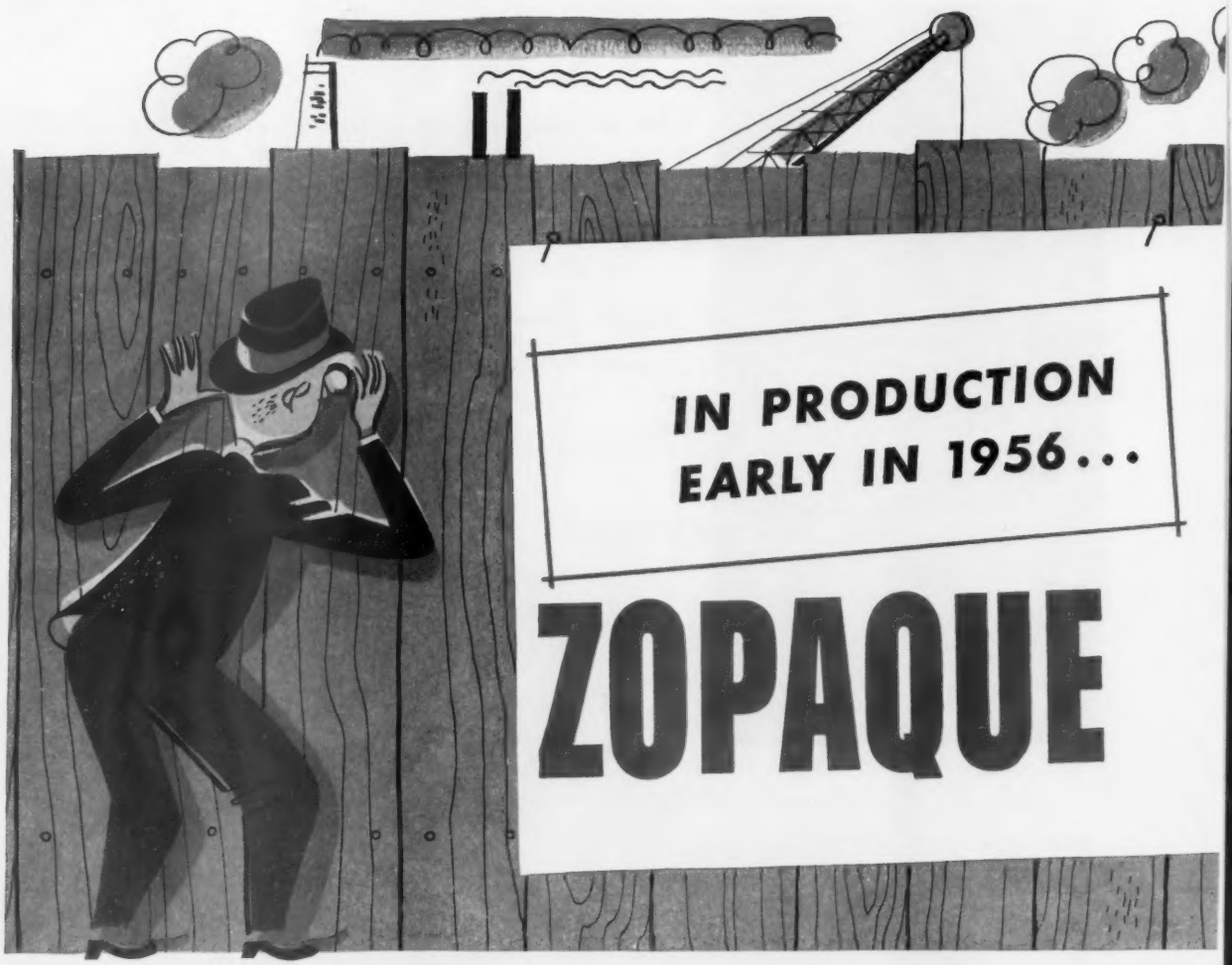


R. D. WOOD COMPANY

PUBLIC LEDGER BUILDING • PHILADELPHIA 5, PENNSYLVANIA

Representatives in Principal Cities

MAKERS OF HYDRAULIC PRESSES AND VALVES • FIRE HYDRANTS • CAST-IRON PIPE • GATE VALVES • GAS PRODUCERS • ACCUMULATORS



First of 3 Big Expansions

TO GIVE YOU BETTER SERVICE WITH NEW ZOPAQUE, THE FINEST TITANIUM DIOXIDE

Glidden research has achieved greater whiteness and a highly accelerated dispersion rate in the new ZOPAQUE Titanium Dioxide. These developments combine to produce pigments with exceptional hiding power, outstanding gloss and color retention, and low reactivity. Early in 1956, Glidden will open its new plant and double its production of ZOPAQUE Titanium Dioxide. With this added production, Glidden will be in a better position than ever to serve your titanium dioxide needs.

Glidden ZOPAQUE Titanium Dioxide is available in both Rutile and Anatase grades.

Write today for more details on Glidden ZOPAQUE, the finest titanium dioxide.

NEW GLIDDEN TITANIUM PLANT

Each Batch of Titanium Ore is Tested in Pilot Plant Before it is Processed!

You are looking at a giant titanium plant in miniature, as set up in the Glidden Laboratories in Baltimore. In this small-scale plant, jet-black titanium ore is transformed into gleaming white pigment through a hydrolysis process. This test provides an accurate check on every shipment of ore received by Glidden. It is part of the Glidden continuous quality control program to provide you with the finest ZOPAQUE Titanium Dioxide at all times.

THE GLIDDEN COMPANY

Chemicals — Pigments — Metals Division

Baltimore, Maryland • Collinsville, Illinois • Hammond, Indiana • Scranton, Pa.

QUALITY Glidden PRODUCTS

"100's of silicas"—only one Cab-o-sil®

So you've seen hundreds of silicas before and they're all alike, except that some are finer than others? Then it's time you tried Cab-o-sil. Cab-o-sil is unlike any other silica you've ever used. It is different, first of all, because it's made differently. No other silica we know of is manufactured like Cab-o-sil — in a hot, gaseous environment by a flame process — instead of by the usual aqueous precipitation method. This unusual process makes Cab-o-sil properties superior to those of other silicas. Not only does Cab-o-sil have high chemical purity, extreme fineness (0.015–0.020 micron) and enormous external surface area (175–200 m^2/gm), but it is also anhydrous and particulate. It is not like precipitated silicas, silica gels, silica aerogels, or other silicas with which you are familiar. It functions differently and more effectively, and in extremely small quantities.

Cab-o-sil has begun a new chapter in the development of fine silicas, a chapter of special appeal to imaginative technical men interested in a new concept of silica application. Many have already discovered that Cab-o-sil is not a filler — it is a performance controller — important in small amounts to the improvement of numbers of products. For example —

12-15 P.H.R. increase tensile strength of butyl wire and cable compounds, give good stiffening effect, good electrical properties; low loadings reinforce butyl-compounded bicycle tubes and tires and, in all butyl compounds, reduce "nerve" of the "green" stock and give faster extrusion with minimum die swell, extremely good weatherability, ozone resistance, insulation resistance, and corona resistance.

2% by weight Cab-o-sil stops drainage in polyester and epoxy glass reinforced laminates — it is easily brushed, sprayed, or squeegeed and reduces orange peel in gel coatings; 1% increases viscosity in non-thixotropic polyester resins from 410 centipoises (Brookfield viscosity) to 8,000 centipoises at 2 r.p.m. and 3,500 centipoises at 20 r.p.m.; 2% produces more uniform plastics coatings.

5-7 P.H.R. Cab-o-sil eliminate cold flow in "green" rubber stocks and improve the extrusion rate; it is the best flow control agent on the market today for the plastics industry; low loadings control flow, give good thixotropy and thickening to plastisols, organosols, and other liquid plastics formulations, as well as to paints and rubber solutions, neoprene, and rubber based adhesives.

2% Cab-o-sil effectively suspends heavy inert pigments in resins; is easily and quickly dispersed by a propeller type mixer for uniform resin distribution; improves "can stability" of paints, retarding the settling of high density prime pigments, and imparting thixotropy and flow control.

2% Cab-o-sil is colorless in resins, thickens without affecting the wetting characteristics, appearance, or application properties of the resin; small quantities keep polyester and epoxy glass resins transparent.

A 4% Cab-o-sil AD aquasol, used as a precoating dispersion in a single step coating operation, produces cleaner white lines and deeper blue background in blueprint paper, more sharply defined colored lines in direct process paper.

0.4% produces a free-flowing sulphur; small percentages impart excellent anti-slip properties and higher film gloss to solvent base floor waxes, give better body and anti-slip properties to inks, act as wetting agents and emulsion stabilizers in latex rubber goods, and aid color development in butyl rubber weatherstripping and bicycle tubes and tires.

These are but some of the examples of how Cab-o-sil is being used industrially by more than 500 companies to improve various products and processes. In each case, the application of Cab-o-sil has proved superior to previously acceptable materials because of its unique combination of properties. Send today for your sample of Cab-o-sil and investigate the possibilities for improving your product manufacture.

CABOT

WHITE PIGMENTS DIVISION RA

GODFREY L. CABOT, INC.

77 FRANKLIN ST., BOSTON 10, MASS.

( ) *I would like to have a representative call.*

NAME_____

TITLE_____

COMPANY_____

ADDRESS_____

_____

Please send CAB-O-SIL sample and:

( ) General Properties, Functions and Uses (#cgen-1)
( ) Cab-o-sil in Rubber (#crub-1)
( ) Cab-o-sil in Butyl Rubber (#crub-2)
( ) Aqueous Dispersions of Cab-o-sil (#cmis-2)
( ) Cab-o-sil as a Transparent Extender for Automotive Enamels (#cpai-1)
( ) Cab-o-sil in Paints (#cpai-2)
( ) Cab-o-sil as a Flatting Agent for Varnishes (#cpai-3)
( ) Cab-o-sil in Polyester-Glass Reinforced Plastics (#cpla-1)
( ) Cab-o-sil in Plastics (#cpla-2)
( ) Cab-o-sil in the Reproduction Paper Industry (#cpap-1)
( ) How to Disperse Cab-o-sil in Water for the Reproduction Paper Industry (#cpap-2)

for new equipment, spares or replacements . . .

UNITED *Service-Proved* CRACKER ROLLS

THERE IS A

UNITED®

service-proved

ROLL

FOR EVERY

- RUBBER
- PLASTICS
- LINOLEUM
- TILE
- PAINT
- OR OTHER

NON-METALLIC *PROCESSING REQUIREMENT*

When you specify UNITED ROLLS, your complete satisfaction is guaranteed by over 50 years' experience in the design and manufacture of rolls for practically every type of rolling application. Precision engineered to the specific requirement of the individual machine or equipment in which they are to be used, UNITED *Service-Proved* ROLLS are in use the world over by processors of rubber, plastics, linoleum, paper, paint and scores of other metallic and non-metallic substances.

Specify UNITED ROLLS for new equipment, spares or replacements. The experience and advice of our rolls engineers is available without obligation.

UNITED ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH, PENNSYLVANIA

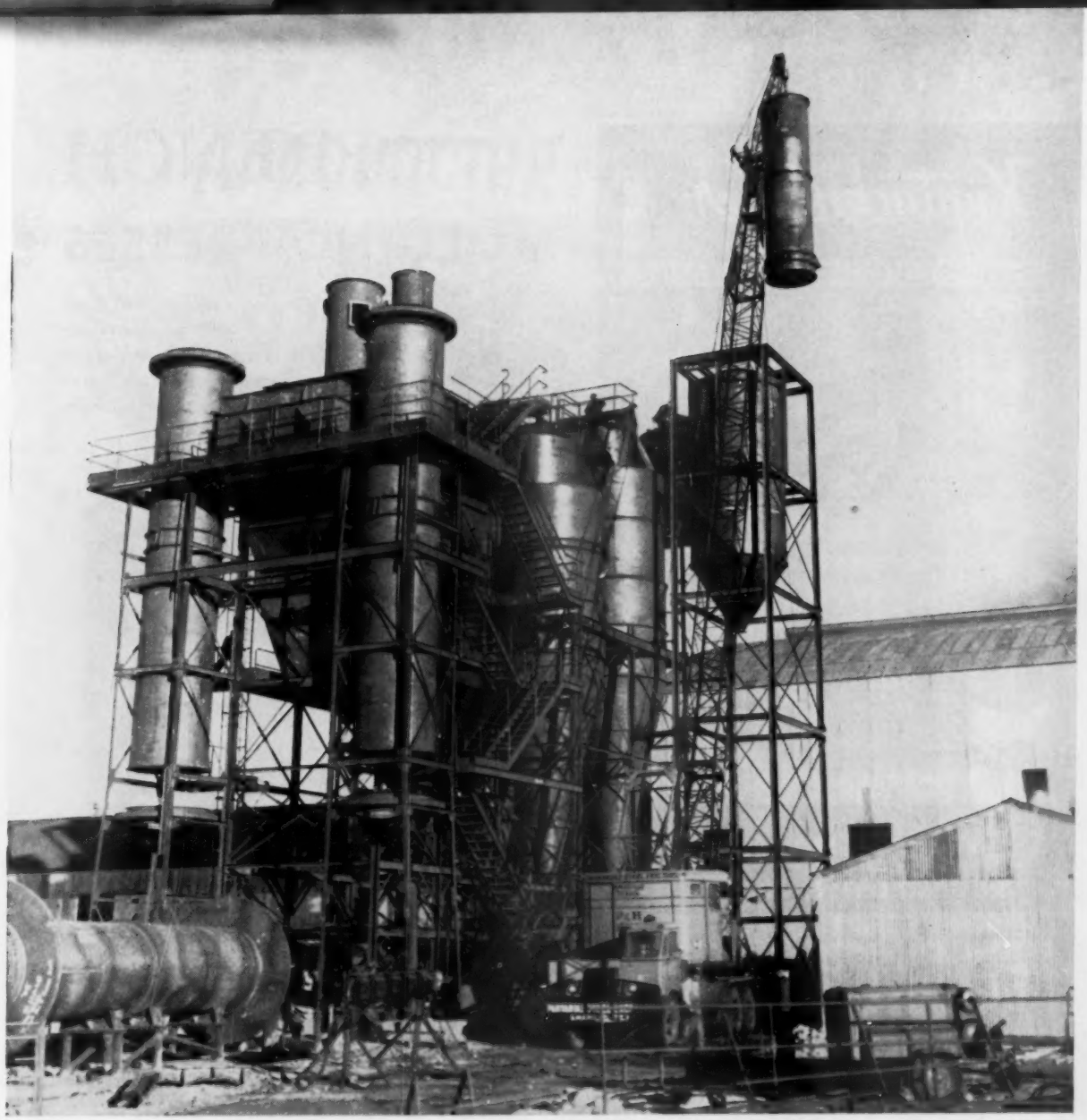
Plants at • Pittsburgh • Vandergrift • Youngstown • Canton • Wilmington (Lobdell United Division)

SUBSIDIARIES: Adamson United Company, Akron, Ohio
Stedman Foundry and Machine Company, Inc., Aurora, Indiana

Designers and Builders of Ferrous and Non-Ferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.

WITCO-CONTINENTAL DOES IT AGAIN!

25,000,000 pounds of furnace black per year from new facilities



New Witco-Continental furnace black facilities at Eunice, New Mexico, now under construction.

Announcing Witco-Continental's important new additions to its modern plant at Eunice, New Mexico... to be on full stream in May. By constantly expanding our facilities, we will have boosted our carbon black production more than 100% in the past 5 years to help meet the rubber industry's growing requirements.

WITCO

36 Years of Growth

WITCO CHEMICAL COMPANY
CONTINENTAL CARBON COMPANY

122 East 42nd Street, New York 17, N. Y.

Chicago • Boston • Akron • Atlanta • Amarillo • Houston • Los Angeles • San Francisco
London and Manchester, England

Kentucky Color

AND CHEMICAL COMPANY, INC.

Louisville 12, Kentucky

RUBBER COLORS

DRY COLORS

CITATION REDS
DURAVYN REDS
PHTHALOCYANINE BLUE, GREEN
CADMIUM YELLOWS
CADMIUM REDS
CHROME YELLOWS
PYRAZOLONE REDS
MOLYBDATE ORANGE

Water Dispersed
RUBBER LATEX COLORS

PHTHALOCYANINE BLUE
PHTHALOCYANINE GREEN
PIGMENT GREEN B
CHROMIUM OXIDE
YELLOW IRON OXIDE
RED IRON OXIDE
ORGANIC REDS

To: Kentucky Color & Chemical Co.
Louisville 12, Kentucky

Gentlemen:

Send me detailed information on Rubber Colors _____

Have representative call _____

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

MY FIRM MAKES _____

FRENCH
MOLDING PRESSES

The combined four side plate presses shown below are another example of flexibility available with French Oil Mill presses. This combination press combines all advantages of our well-known side plate press, with added economy in price and floor space.

78 ton hot plate presses;
four 4-½ inch openings;
18 inch stroke;
and 14 inch by 14 inch pressing surface.

SIDE PLATE PRESSES MEAN —

ACCURACY
DEPENDABILITY
LOW MAINTENANCE

YOU CAN IMPROVE YOUR CLOSE TOLERANCE MOLDING WITH

FRENCH SIDE PLATE PRESSES.

Consult us about your pressing requirements.

Write for illustrated catalog

THE FRENCH OIL MILL MACHINERY CO.
(HYDRAULIC PRESS DIVISION)
1022 GREENE ST. PIQUA, OHIO

Announcing VA-7

... an economical vulcanizing agent for heat-resistant, non-blooming stocks

VA-7 is a new liquid vulcanizing agent for all types of unsaturated elastomers. It provides economical "sulfurless" cures for nitrile, GR-S and natural rubber stocks.

Stocks compounded with VA-7 display an outstanding combination of heat aging resistance . . . . high tensile strengths . . . . good hot compression set resistance . . . . and non-blooming characteristics in the cured and uncured states.

VA-7 also offers processing advantages—it can be dispersed more easily and uniformly than sulfur. Stable emulsions for curing latices can easily be prepared from VA-7.

The moderate price of VA-7 is another feature that makes this product worth your investigation. *Try VA-7 for heat-resistant, non-blooming stocks at reasonable cost!*

For compounding information and a sample of VA-7 fill out and mail the handy coupon.

CHECK LIST OF VA-7 PROPERTIES

Outstanding heat aging resistance
Non-blooming in cured or uncured state
High strengths at low concentrations
Easy and uniform dispersion
Good hot compression set
Moderate price

THIOKOL CHEMICAL CORPORATION
780 N. Clinton Avenue
Trenton 7, New Jersey

Please send me compounding information ☐
and a sample of VA-7 ☐

NAME _____ FUNCTION _____
COMPANY _____
STREET _____
CITY AND ZONE _____ STATE _____

Thiokol® Chemical Corporation

SYNTHETIC RUBBERS • PLASTICIZERS • CHEMICALS • ROCKET MOTORS

780 NORTH CLINTON AVENUE • TRENTON 7, NEW JERSEY

In Canada: Naugatuck Chemicals Division, Dominion Rubber Company, Elmira, Ontario

Now Available . . .

PROCEEDINGS of the Third Rubber Technology Conference

Copies of all the papers presented at the Conference held in London on June 22-25, 1954, under the auspices of the Institution of the Rubber Industry, are presented in this volume, together with the discussions on each paper. The papers are world-wide in character and represent the latest thinking in the science and general technology of rubber. This informative volume is a **must** for all who wish to keep abreast of developments in the field.

TITLES OF PAPERS

Properties of Natural Rubber Latex

Micro-Gel in Latex and Sheet Rubber. *R. Freeman.*
Improved Rubbers by the Enzymatic Deproteinization of Skim Latex. *J. E. Morris.*
Stability of Ammoniated Latex and Soap-Stabilized Emulsions in the Presence of Complex Zinc Salts. *T. S. McRoberts.*
Variability of Hevea Latex. *W. L. Resing.*
Zinc Oxide Testing of Latex. *E. W. Madge, H. M. Collier,* and *J. L. M. Newnham.*
Hevea Latex: Its Structure and Viscosity. *G. Verhaar.*
Contribution to the Study of Mineral Elements in Field Latex. *E. R. Beaufils.*
Rubber Peptized on the Plantation. *G. Giger, J. Lemee* and *M. Liponski.*

Production and Evaluation of Synthetic Rubber

Cation and Anion Influence in the Alfin Reagent for the Polymerization of Butadiene. *A. A. Morton, I. Nelidow* and *E. Schoenberg.*
Evaluation of Synthetic Rubbers and Latices. *I. D. Patterson.*
Recent Studies on the Structure of Synthetic Rubber. *R. F. Dunbrook, B. L. Johnson, J. L. Binder, J. M. Willis,* and *E. L. Carr.*
Rubbery Copolymers from Unsaturated Ketones. *W. Cooper, T. B. Bird,* and *E. Catterall.*
Preparation and Properties of Condensation Block Copolymers. *D. H. Coffey and T. J. Meyrick.*
Graft Polymers Derived from Natural Rubber. *G. F. Bloomfield, F. M. Merrett, F. J. Popham,* and *P. McL. Swift.*
Oil Resistance of Synthetic Rubbers Over Very Long Periods of Time. *B. Särnö.*
Structure and Solution Properties of High Molecular Weight Butadiene-Styrene Copolymers. *R. B. MacFarlane* and *L. A. McLeod.*
Pyridinium High Polymers—A New Class of Oil-Resistant Synthetic Rubbers. *W. B. Reynolds, J. E. Pritchard, M. H. Opheim,* and *G. Kraus.*

Chemistry of Rubber

Studies in Latex Particle Surface Reactions: Kinetics of Hydrochlorination of Unvulcanized and Vulcanized Latices. *M. Gordon* and *J. S. Taylor.*
Oxygen-Absorption Effects in Cured and Uncured Rubber. *R. L. Stafford.*
Infra-Red Spectroscopic Analysis of Elastomers. *W. H. T. Davison* and *G. R. Bates.*
Structural Characteristics of the Sulfur Linkage in Natural Rubber Vulcanizates. *L. C. Bateman, R. W. Glazebrook, C. G. Moore,* and *R. W. Saville.*
Chemical Reactions of Antioxidants Used in Vulcanized Rubber. *P. Schneider.*
Cross-Linking and Radiation Effects in Some Natural and Synthetic Rubbers. *A. Charlesby* and *D. Groves.*

Physics of Rubber

Modification of the Permeability of Natural Rubber Vulcanizates. *P. Thirion.*
Reinforcement and Tear Strength Anisotropy. *H. J. J. Janssen.*
Elasticity of Ideal and Real Rubberlike Materials. *H. M. James* and *E. Guth.*
Study of Rubberlike Polymers by Nuclear Magnetism. *B. A. Mrowca* and *E. Guth.*
Natural Rubber Compounds for Intermittent Low Temperature Service. *W. P. Fletcher, A. N. Gent,* and *R. I. Wood.*
Theoretical Model for the Elastic Behavior of Filler-Reinforced Vulcanized Rubbers. *L. Mullins* and *N. R. Tobin.*
Non-Linearity in the Dynamic Properties of Rubber. *A. R. Payne.*

Developments in Testing Methods

Tear-Down Adhesion Testing. *B. Pickup.*
Constant Power Principle in Abrasion Testing. *E. F. Powell* and *S. W. Gough.*
Changes of Electrical Resistance of Rubbers Loaded with Carbon Black. *D. G. Marshall.*
Tire Cord Fatigue and Fatigue Testing. *R. S. Goy.*
Pneumatic Tire Testing. *J. I. S. Williams* and *R. G. Clifton.*
Fast, Easy Test for Measuring Relative State of Cure. *L. R. Sperberg.*

Compounding: Theory and Practice

Nature of "Chemisorptive" Mechanisms in Rubber Reinforcement. *V. A. Garten* and *G. K. Sutherland.*
Interaction of Rubber and Fillers During Cold Milling. *W. F. Watson.*
Role of Intermediate Level Carbon Blacks in Rubber. *I. Drogin.*
Role of Particle Diameter and Linkage Formation in Rubber Reinforcement. *A. F. Blanchard.*
Lignin as a Compounding Ingredient for Natural Rubber. *I. Sagajllo.*
Mooney Viscosity of Carbon Black-Rubber Mixtures. *M. Studebaker.*
Oil Extension of Natural Rubber, *G. J. van Amerongen* and *H. C. J. de Decker.*
Behavior of Highly-Filled Rubber Vulcanizates. *K. C. Bryant* and *D. C. Bissett.*
Rubber Reinforcement by Resins Formed in Latex. *J. van Alphen.*

Miscellaneous Technology

Abraded Filament Tire Cord. *E. R. Gardner, A. E. Herbert* and *W. C. Wake.*
Effect of Heat Setting on the Physical Properties of "Terylene" Polyester Fiber. *D. N. Marvin* and *T. J. Meyrick.*
Time Dependent Effects in Tire Cords. *J. O. Wood* and *W. F. Kilby.*
Wave Phenomena in Tires at High Speed. *D. M. Turner.*
Tread Wear and Fuel Consumption of Tires. *H. C. J. de Decker, R. Houwink,* and *G. J. van Amerongen.*

780 Pages **Completely Indexed**

$13.50 (postpaid)*

Send orders to:

RUBBER AGE

Exclusive Sales Agents in the United States and Canada

101 West 31st Street, New York 1, N. Y.

* Add 3% Sales Tax for delivery in New York City.

is your

Indonex

PLASTICIZER

circular file complete?

Check this list of INDONEX Plasticizer Circulars. If you are missing any and would like to complete your file, circle the numbers you need in the coupon and mail. Your request will be given prompt attention.

Circulars contain suggested formulations for the applications described, specifications of INDONEX Plasticizer grades recommended for each application, physical data—original and aged—on the compounds, etc.

Circulars Available INDONEX Plasticizers:

Circ. 4—in Tire Carcass Compounds
Circ. 5—in Footwear and Heel Compounds
Circ. 6—in Camel Back
Circ. 7—in Motor Mount and Bumper Compounds
Circ. 8—in Wire Jacket and Other Extruded Compounds
Circ. 12—in Low Hardness Mechanical Goods
Circ. 14—in Hycar OR-15
Circ. 15—in Natural Rubber-Reclaim Mechanical Goods and Carcass Compounds
Circ. 19—with Various Fillers in Reclaim Stocks
Circ. 21—in Mechanical Goods Compounds for High Temperature Curing
Circ. 22—in Natural Rubber of Various Qualities
Circ. 23—in Tire Curing Bag Compounds
Circ. 24—in Carcass Compounds
Circ. 25—with Various Fillers in Natural Rubber Stocks
Circ. 26—in Heat Resistant Low Compression Set Compounds
Circ. 27—in Hycar Gasket and Packing Compounds
Circ. 28—in Ground Scrap in Low Cost Compounds
Circ. 29—in Extruded Mechanical Goods
Circ. 30—in Butyl Mechanical Goods
Circ. 32—in Hose and Cover Compounds
Circ. 33—in Low Temperature GR-S Compounds
Circ. 34—in Wire & Cable Jacket Compounds
Circ. 35—in Semi-Ebonite Compounds
Circ. 36—with High Styrene Copolymers
Circ. 40—in Polyacrylic Rubbers
Circ. 41—in Neoprene W. Compounds
Circ. 42—in GR-S Camel Back
Circ. 43—in Reclaim Compounds
Circ. 44—in Super-Aging Neoprene Compounds
Circ. 45—in Extruded Butyl Automotive Compounds
Circ. 46—in "Cold Rubber" (LTP GR-S) Compounds
Circ. 47—in High Mooney Neoprene (Type WHV)
Circ. 48—in Oil Resistant GR-S Compounds
Circ. 49—in Hard Rubber Compounds
Circ. 50—in Industrial Tire Compounds
Circ. 51—in Extruded Bumper Compounds
Circ. 52—in Molded Bumper Compounds
Technical Bulletin 13—General bulletin on INDONEX Plasticizers and their compatibility with other materials

INDOIL®
CHEMICAL PRODUCTS

INDOIL CHEMICAL COMPANY
910 South Michigan Avenue
Chicago 80, Illinois

Please send me INDONEX Plasticizer Circulars (circle numbers)

4 5 6 7 8 12 14 15 19 21 22
23 24 25 26 27 28 29 30 32 33 34 35
36 40 41 42 43 44 45 46 47 48 49 50
51 52

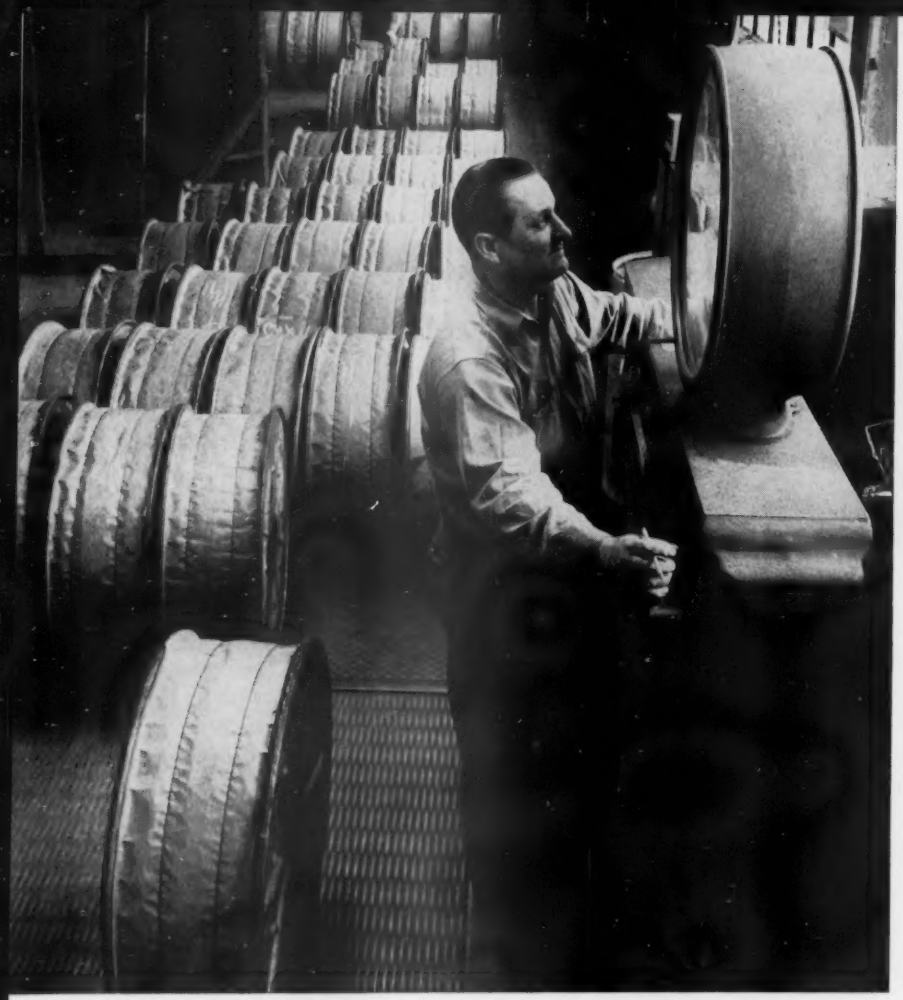
Name _____

Title _____

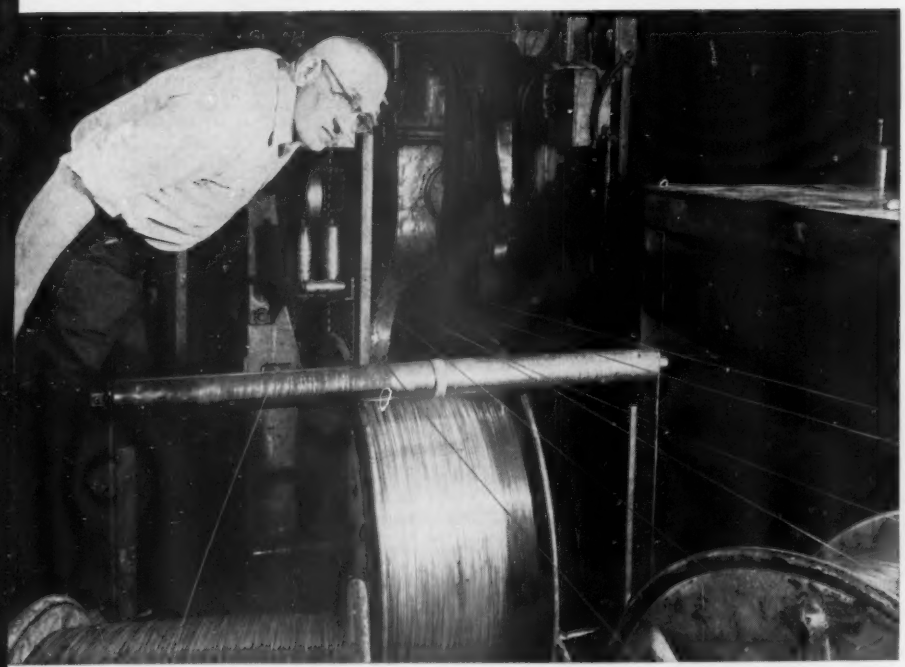
Address _____

City _____ Zone _____ State _____

-CH-1345-



Only the finest high-tensile steel wire such as that produced on special equipment at the Akron, Ohio, plant of Johnson Steel & Wire Company, can build tire beads that provide the strength needed for tubeless tires.



Smooth and straight, parallel tire bead wires uncoil into a bead building machine where they are encased in synthetic compound that adheres to the bright bronze-plated surfaces.

Layers of wire, insulated by synthetic compound to prevent friction, are encased in a "flipper." The flipper is built into the green carcass to become an integral part of the tire.

Steel

While driving your automobile down some peaceful country highway, have you ever struck a chuck-hole so hard you thought it might rip the tires off the wheels?

The fact is that few tires escape these occurrences at sometime or another while they are in service on your car.

Truck tires, carrying heavier loads, take rougher punishment. The tires on earth-moving equipment stand up under it continually in normal day-to-day operations. So tires are built for rugged use, and then some.

Take the tire beads of steel wire that anchor the tire to the rim, for example. It is a special wire.

As produced by Johnson Steel and Wire Company for all the blue-chip tire manufacturers, it meets exacting requirements for high tensile strength, twisting strength, elongation, and has special surface finish that provides adhesion to synthetic rubber compound in the tire.

Without steel wire, the revolutionary new tubeless tire would be impossible. In the old-style tire with tube, the tube contains the air pressure in the tire. In the tubeless tire, the tire walls must be anchored to the rim of the wheel so tightly that the air pressure is sealed in without a tube. Even under tremendous impact the air-tight seal will not be broken.

Look at the way Johnson's tire bead

Revolutionary new tubeless tires are anchored to wheel rims by steel wires of tremendous strength. Tire beads such as those for The Goodyear Tire & Rubber Company's tubeless auto tire, for example, contain 32 individual wires providing a total bead strength of 4½ tons.

Death-defying stunt drivers batter tubeless tires mercilessly. Steel bead wires absorb the impact, hold the tires to the rim so tightly that sealed-in air pressure cannot leak even under the most rugged road shocks. Tests like these demonstrate dependability of tire bead wire.

Tendons For Tubeless Tires

wire is built into tubeless tires at The Goodyear Tire & Rubber Company, for instance. To begin with, the wire is about 1/32-of-an-inch in diameter, very accurately drawn to a tolerance of two thousandths of an inch—so small that a 750-pound reel of it contains 38 miles of wire.

Yet this wire has a breaking strength of 285 pounds. In the construction of a bead for the tubeless automobile tire, the bronze-plated wires from several reels feed parallel into a bead building machine. They are insulated with synthetic rubber compound that adheres to the surface finish and encases them, and emerge in the form of flat black tape.

The tapes containing several parallel wires are wound one on top of another and wrapped together in a "flipper" containing 16 wires. The flipper is then encased by the tire fabric, making it an integral part of the tire construction.

The conventional 6.70-15 tubeless tire for your automobile, then, contains a total of 32 wires in the beads on both sides of the tire. This gives you a total bead strength in each tire equal to four-and-one-half tons—more than twice the entire weight of your automobile.

The new tubeless truck tires making their debut offer truckers assurance of less road delay and less deadweight load.

The beads in a tubeless tire for a five-to-ten ton trailer truck, for example, contain a total of 196 wires in both sides of the tire. This gives each tire a total bead strength of 28 tons—more than equal to the entire weight of a heavily loaded truck.

Johnson's bead wire meets tire makers' requirements with consistent uniformity, and for a very good reason. Johnson has been one of the pioneers in developing tire bead wire and other specialty wires serving a variety of industries.

Today its modernized facilities are producing a range that includes:

Aircraft cord wire, armature binding wire, wire for brushes, metal stitching, hose reinforcement, stapling wire, bobby pin wire, rope wire, oil tempered and MB hard drawn spring wire, and music spring wire right down to sizes as fine as a human hair.

If you use specialty wires in the manufacture of your products, why not call our closest district office and explore the cost-saving advantages of Johnson quality today?

Johnson Steel & Wire Company, Inc.

Worcester, Massachusetts

***a subsidiary of* Pittsburgh Steel Company**

Grant Building • Pittsburgh 30, Pa.

District Sales Offices					
	• Atlanta	• Chicago	• Cleveland	• Columbus	• Dallas
	• Dayton	• Detroit	• Houston	• Los Angeles	• New York
	• Philadelphia	• Pittsburgh	• San Francisco	• Tulsa	• Warren, Ohio

MR. CLIMCO SAYS...

CLIMCO LINERS

Permit Horizontal Storage of Stock

Horizontal storage is usually easier and more efficient — vertical storage has a tendency to curl the edges of the stock and liner, causing stock losses. When your liners are Climco Processed, you can confidently store them horizontally because the pressure of the roll will not cause sticking.

Climco Processed Liners will help you — whatever your method of storage.

They speed work by stopping stock adhesions and insuring easy separation. The life of your liner is increased, tackiness of the stock is preserved and loss of stock reduced. In addition to these production benefits, Climco Processed Liners protect the stock itself in many important ways.

Since 1922 Climco Processed Liners have proved their worth to the rubber industry. Give them a trial in your plant.

ILLUSTRATED LINER BOOKLET

Tells all about Climco Liners and Linerette and how to get better service from liners. Write for your copy now.

THE CLEVELAND LINER & MFG. CO.
5508 Maurice Ave. • Cleveland 27, Ohio, U.S.A.
Cable Address: "BLUELINER"

LINERETTE INTERLEAVING PAPER
Treatment Contains
NO OIL OR WAX
Samples on Request

CLIMCO
PROCESSED LINERS

Serving the Industry Since 1921

HI-SIL®

. . . the growing star in reinforcing pigments

AMONG the brightest stars on the widening horizon of reinforcing pigments have been the Hi-Sil materials. Prior to 1948, extremely fine silicas were little more than curiosities. Generally produced by a thermal reaction in the gas phase, they consequently had little hope of competing on an economic footing with large volume reinforcing fillers then in use.

The steady downward trend of Hi-Sil prices since its introduction in that year has continually expanded uses, which in turn has strengthened the product's economic base. Today, due to this trend and the job it has obviously done for the industry, reinforcing silica virtually rates as a necessity for many facets of the rubber trade.

Naturally enough, the established Silene EF outlets were among the first to feel the impact of Hi-Sil. However, availability of a white, high-reinforcing pigment has made realities of several new products which have previously been thought impossible.

Not the least impetus behind the enlarging market has been the keen awakening by the public and by industrial designers of the effective use of color. The desire for color in finished parts, together with retention or improvement of physical properties, has widened sales outlets for numerous rubber goods suppliers.

Here again, as with Calcene and Silene, the performance of Columbia-Southern pigments has filled a need of consumers.

And, here again, the impact of the times on the product has been felt. Our original Hi-Sil (now, Hi-Sil 101) has a lusty kin in Hi-Sil 233, which is even more reinforcing and yet of lower cost. Hi-Sil X303, a high purity silica, is a product of research primarily designed for the silicone rubber field, meeting a specific, rather than a general industry requirement.

Without question, there are dramatic times ahead for reinforcing silica. Columbia-Southern is proud to have pioneered the practical fields of silica application and our efforts will continue.

For further information on Hi-Sil, or for working samples, write today to Columbia-Southern Chemical Corporation, Pigments Department, One Gateway Center, Pittsburgh 22, Penna.

COLUMBIA-SOUTHERN CHEMICAL CORPORATION

SUBSIDIARY OF PITTSBURGH PLATE GLASS COMPANY

ONE GATEWAY CENTER · PITTSBURGH 22 · PENNSYLVANIA

DISTRICT OFFICES: Cincinnati Charlotte • Chicago • Cleveland Boston • New York • St. Louis Minneapolis • New Orleans • Dallas Houston • Pittsburgh • Philadelphia San Francisco

IN CANADA: Standard Chemical Limited and its Commercial Chemicals Division

Goodrich-Gulf Chemicals, Inc.

X-RAY EYE SAYS STOP TO METAL

This bale of Ameripol rubber has just been tested by the metal detector. That machine spots any metal fragments buried in the bale. Should metal fragments be present, the machine rings a bell, the conveyor stops and the bale is put aside.

Any metal present can cause damage to equipment during the processing of rubber into products. This step is another example of quality control in the manufacture of Ameripol—the standard of industry in man-made rubber.

A FAMOUS NAME...
AN ESTABLISHED
PRODUCT

Ameripol
REG. U. S. PAT. OFF.
RUBBER

Cold Non-Oil Polymers
•
Cold Oil Masterbatch Polymers
•
Hot Non-Oil Polymers

Goodrich-Gulf Chemicals, Inc.
3121 Euclid Avenue • Cleveland 15, Ohio

THE NAME TO REMEMBER FOR QUALITY BACKED BY YEARS OF RESEARCH AND EXPERIENCE

Lithols... Red Lake Cs...
Bonadur Reds... Naphthols... Cadmiums...
Cyanamid's Pigments Division
Offers a Red Pigment
for Every Rubber Application
Whatever your requirements in red pigments, one of these efficient Cyanamid pigments can meet them:
LITHOLS and RED LAKE Cs . . . for low-cost color strength, brilliance, good working properties.
BONADUR REDS . . . for superior light fastness and heat stability, combined with non-migration and resistance to bleed in oils.
NAPHTHOLS...for high color strength and brilliance, with outstanding resistance to acids, alkalis, soaps and chemical detergents.
CADMIUMS...for maximum stability and permanence.
Let your Cyanamid Pigments representative help you select the type best suited to your needs.
CYANAMID
AMERICAN CYANAMID COMPANY
PIGMENTS DIVISION
30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.
BRANCH OFFICES AND WAREHOUSES IN PRINCIPAL CITIES

EDWIN J. THOMAS

Portrait by Fabian Bachrach

"...added over 20,000 employees to The Payroll Savings Plan."

"The Savings Bond Program—like any other program in a corporation—will succeed *only* if it has the complete support of top management. Recently the Goodyear Tire & Rubber Company added over 20,000 employees to the Payroll Savings Plan, attaining an overall participation of over 71%. While the drive itself was successful I feel the job is only half done. Now we are installing a program to maintain this high peak of participation. Such a program will constantly keep the merits of the program before each employee, encouraging him to provide his own security through this effortless plan of saving."

EDWIN J. THOMAS, ***President***
The Goodyear Tire & Rubber Company, Inc.

What is the percentage of employee participation in *your* Payroll Savings Plan? If it is less than 50%, get in touch with Savings Bond Division, U.S. Treasury Department, Washington, D. C. Your State Sales Director will be glad to help you increase your participation to 60% or higher. A phone call, telegram or letter to Savings Bond Division, U.S. Treasury Department will bring a prompt response.

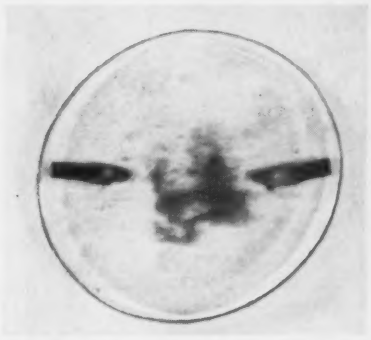
The United States Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and

RUBBER AGE

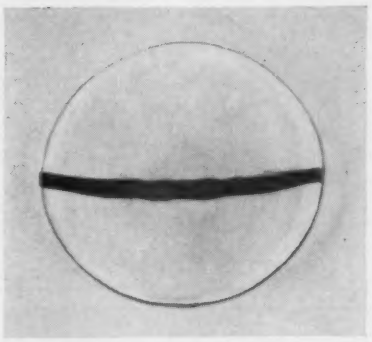
KEL-F® ELASTOMER
IS SHATTERING IDEAS ABOUT RUBBER

Challenging new fluorocarbon rubber has outstanding...
CHEMICAL RESISTANCE...HEAT RESISTANCE

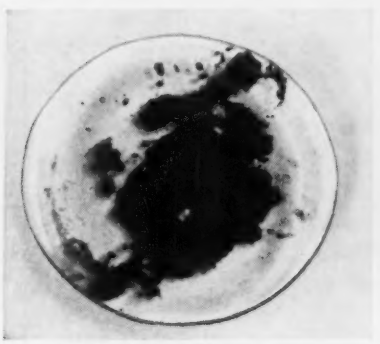
BUNA-N—10 min. immersion in RFNA



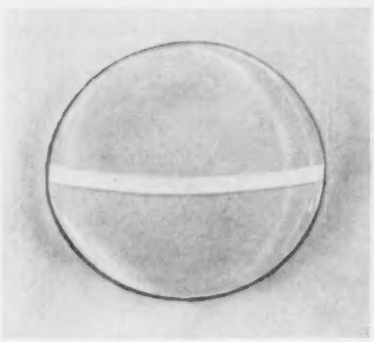
NATURAL RUBBER—10 min. immersion in RFNA



BUTYL—2 hr. immersion in RFNA



GRS—10 min. immersion in RFNA



KEL-F ELASTOMER—one week immersion in RFNA

IMMERSION IN RED FUMING NITRIC ACID for one week has no appreciable effect on the physical properties of KEL-F Elastomer. Extensibility and hardness remain virtually unchanged. Other available rubbers disintegrate within a matter of minutes.

When severe operating conditions demand a chemical rubber that *must* stand up under high temperatures and corrosive atmospheres—KEL-F Elastomer is the answer.

Developed by Kellogg, KEL-F fluorocarbon rubber combines superior elastomeric properties with excellent chemical resistance and thermal stability. Other outstanding advantages include: high chemical resistance to solvents, fuels and lubricants . . . low moisture absorption . . . non-flammability . . . excellent resistance to weathering and microorganisms.

This *unique* combination of properties makes KEL-F Elastomer useful in applications such as heat-and-chemical-resistant hose, tubing, diaphragms, gaskets, seals, tank linings, corrosion-resistant clothing, paints, flame-resistant coatings, and electrical insulation.

If your work requires an elastomer with outstanding resistance to heat and corrosion, look into KEL-F Elastomer. Our technical staff is prepared to assist designers, engineers, and production men in adapting KEL-F Elastomer to their individual needs. Kellogg supplies KEL-F Elastomer in the gum form only. Names of qualified fabricators of specific end uses of KEL-F Elastomer are available on request.

HOT OFF THE PRESS! *Our newly published booklet, "KEL-F Elastomer," is yours for the asking. Just fill out and mail coupon below for your free copy.*

®KEL-F is the registered trademark of The M. W. Kellogg Company for its fluorocarbon products.

THE M. W. KELLOGG COMPANY
Subsidiary of Pullman Incorporated
Chemical Manufacturing Division
P. O. Box 469, Jersey City, N. J.

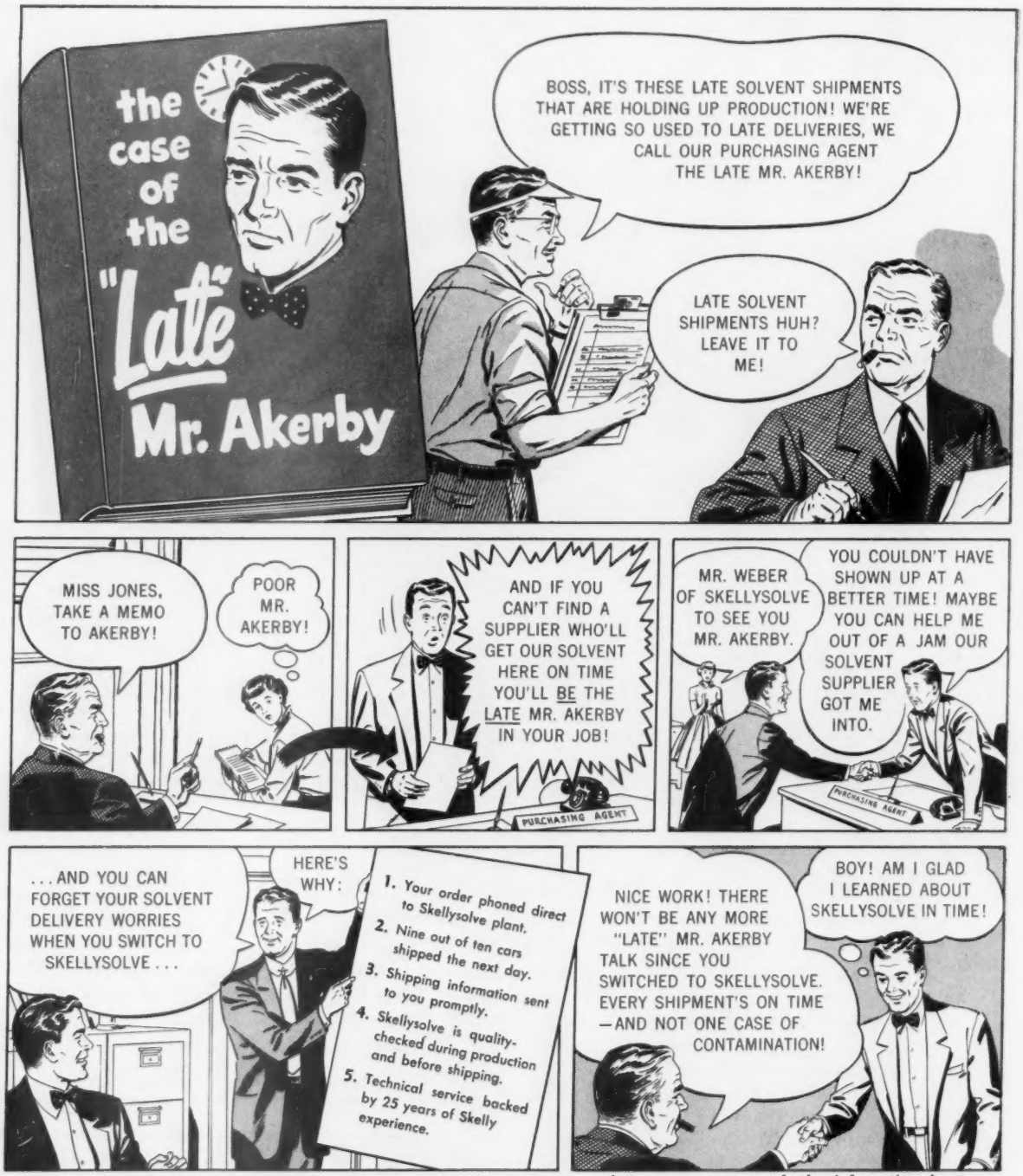
Send me a copy of your new booklet, "KEL-F ELASTOMER."

Name_____

Firm_____ Position_____

Address_____

City_____ Zone_____ State_____


the case of the "Late" Mr. Akerby
BOSS, IT'S THESE LATE SOLVENT SHIPMENTS THAT ARE HOLDING UP PRODUCTION! WE'RE GETTING SO USED TO LATE DELIVERIES, WE CALL OUR PURCHASING AGENT THE LATE MR. AKERBY!
LATE SOLVENT SHIPMENTS HUH? LEAVE IT TO ME!
MISS JONES, TAKE A MEMO TO AKERBY!
POOR MR. AKERBY!
AND IF YOU CAN'T FIND A SUPPLIER WHO'LL GET OUR SOLVENT HERE ON TIME YOU'LL BE THE LATE MR. AKERBY IN YOUR JOB!
PURCHASING AGENT
MR. WEBER OF SKELLYSOLVE TO SEE YOU MR. AKERBY.
YOU COULDN'T HAVE SHOWN UP AT A BETTER TIME! MAYBE YOU CAN HELP ME OUT OF A JAM OUR SOLVENT SUPPLIER GOT ME INTO.
PURCHASING AGENT
. . . AND YOU CAN FORGET YOUR SOLVENT DELIVERY WORRIES WHEN YOU SWITCH TO SKELLYSOLVE . . .
HERE'S WHY:
1. Your order phoned direct to Skellysolve plant.
2. Nine out of ten cars shipped the next day.
3. Shipping information sent to you promptly.
4. Skellysolve is quality-checked during production and before shipping.
5. Technical service backed by 25 years of Skelly experience.
NICE WORK! THERE WON'T BE ANY MORE "LATE" MR. AKERBY TALK SINCE YOU SWITCHED TO SKELLYSOLVE. EVERY SHIPMENT'S ON TIME —AND NOT ONE CASE OF CONTAMINATION!
BOY! AM I GLAD I LEARNED ABOUT SKELLYSOLVE IN TIME!

It may pay you to get further information about Skellysolve. Why not write or call us today?

Skellysolve for Rubber and Related Industries

SKELLYSOLVE-B. For making quick-setting cements for the shoe, tape, container, tire and other industries. Quick-drying, with no foreign taste or odor in dried compound. Closed cup flash point about -25°F.

SKELLYSOLVE-C. For making quick-setting cements with a somewhat slower drying rate than those compounded with Skellysolve-B. Closed cup flash point about 13°F.

SKELLYSOLVE-H. For general use in manufacturing operations and cements, where faster evaporation rate than that of Skellysolve-C is desired. Closed cup flash point about -16°F.

SKELLYSOLVE-L. For general manufacturing operations where a medium evaporation rate is required. Closed cup flash point about 12°F.

SKELLYSOLVE-R. For general use in tire building and a variety of other manufacturing operations and cements. Reduces evaporation losses. Medium quick final dry. Lessens bloating and skinning tendency. Closed cup flash point about -25°F.

Ask about our new Skelly Petroleum Insoluble Grease.

SKELLY **Skellysolve**

SKELLY OIL COMPANY
Industrial Division
605 West 47th Street, Kansas City 41, Mo.

HOW FARREL-BIRMINGHAM CAN *BLUEPRINT* YOUR WAY TO INCREASED PRODUCTION EFFICIENCY

The Farrel-Birmingham Engineering Planning Division can benefit you in two ways. Provide you with a layout that will help you cash in on the potential of existing equipment, or devise the ideal setup for your particular production aims.

A layout is composed of production machines matched in capacity to prevent "choking or starving" of succeeding units. Production flows without costly interruption. Manual aid and supervision are cut to a minimum.

Farrel-Birmingham designs these layouts to meet widely varying physical and economic requirements. Our engineers will work with your engineers to help you select the right system for your needs.

Send for details of processing setups, and ask for information about any of the production units listed below.

FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONNECTICUT

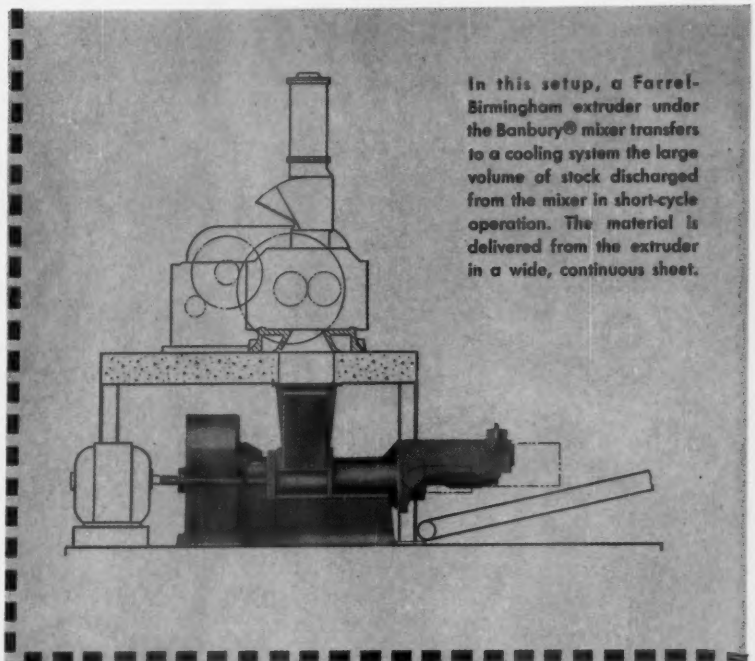
Plants: Ansonia and Derby, Conn., Buffalo and Rochester, N. Y.

Sales Offices: Ansonia, Buffalo, New York, Akron, Chicago, Fayetteville (N. C.), Los Angeles, Houston

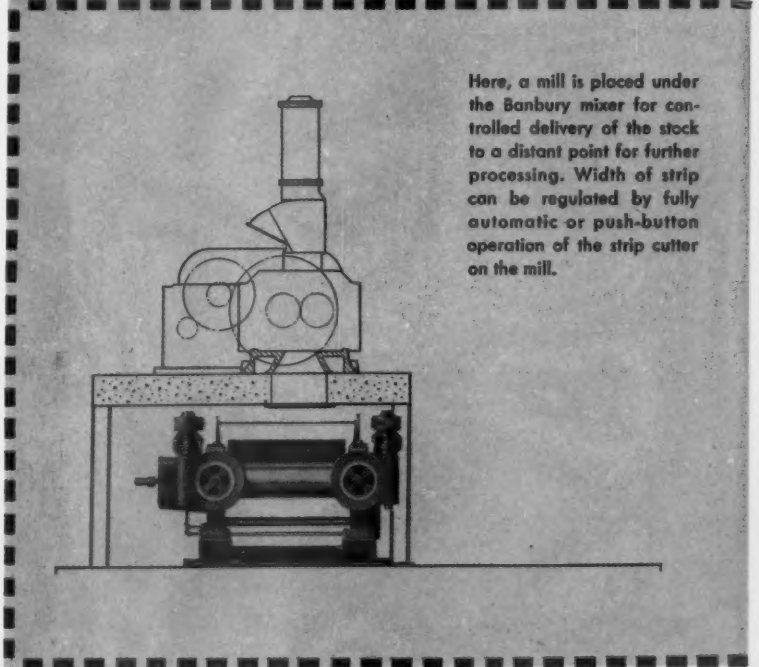
FB-999

F-B PRODUCTION UNITS

Banbury Mixers • Plasticators • Pelletizers • Extruders • Calenders • Mixing, Grinding, Warming and Sheeting Mills • Refiners • Crackers • Washers • Hose Machines • Bale Cutters • Hydraulic Presses and Other Equipment for Processing Rubber and Plastic Materials.

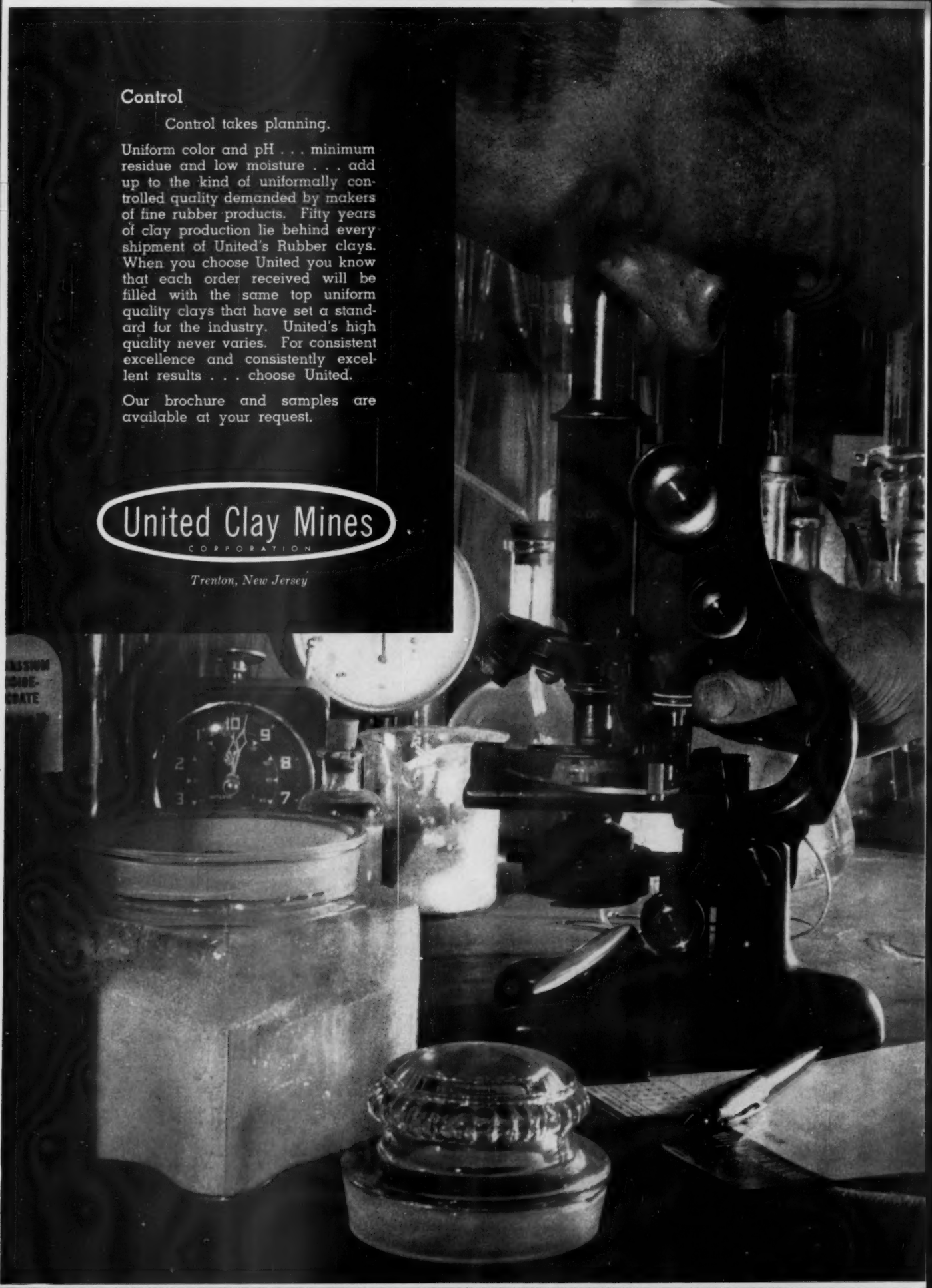


In this setup, a Farrel-Birmingham extruder under the Banbury® mixer transfers to a cooling system the large volume of stock discharged from the mixer in short-cycle operation. The material is delivered from the extruder in a wide, continuous sheet.

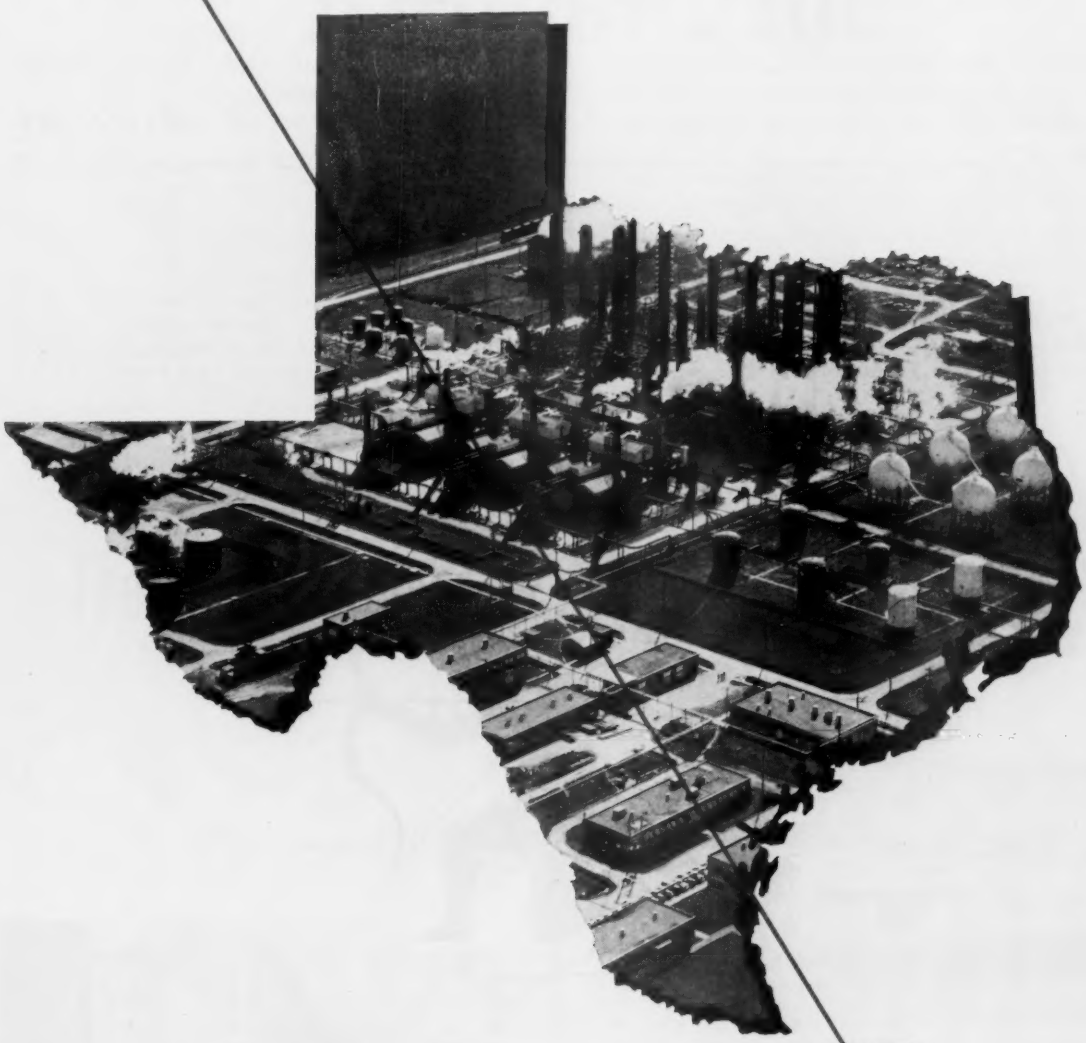


Here, a mill is placed under the Banbury mixer for controlled delivery of the stock to a distant point for further processing. Width of strip can be regulated by fully automatic or push-button operation of the strip cutter on the mill.

Farrel-Birmingham®


Control
Control takes planning.
Uniform color and pH . . . minimum residue and low moisture . . . add up to the kind of uniformally controlled quality demanded by makers of fine rubber products. Fifty years of clay production lie behind every shipment of United's Rubber clays. When you choose United you know that each order received will be filled with the same top uniform quality clays that have set a standard for the industry. United's high quality never varies. For consistent excellence and consistently excellent results . . . choose United.
Our brochure and samples are available at your request.
United Clay Mines
CORPORATION
Trenton, New Jersey

much more than meets the eye



You are looking at our Houston plant . . . America's second largest butadiene facility . . . the only non-captive butadiene producer.

What you see is a completely modern plant which is currently being expanded by more than 50%. What you *don't* see is the 15-year experience of our production personnel in operating this plant as a Government facility. Nor can you see our determination to broaden the uses of butadiene by making it freely available in volume at economic prices.

We invite discussion of your future requirements for butane-derived hydrocarbons.

Petro-Tex

PETRO-TEX CHEMICAL CORPORATION

HOUSTON 1, TEXAS

A JOINT ENTERPRISE OF

FOOD MACHINERY AND CHEMICAL CORPORATION AND TENNESSEE GAS TRANSMISSION COMPANY

North-East, South or West,

Naugatuck is there to serve you

With latex compounds, of course! For Naugatuck—world's leading compounder of rubber and/or plastic latices, known as LOTOLS®—now operates *three* modern compounding plants.

Strategically located at Naugatuck, Connecticut; Gastonia, North Carolina; and Los Angeles, California; they provide fast, economical delivery to all parts of the country. These plants are equipped with modern, high-speed measuring devices permitting *fast* and *accurate* formulation of latex compounds to meet the exact needs and equipment of the user.

Whatever your need for these LOTOLS...whatever your location...there's more reason now than ever to make Naugatuck your regular supplier.

Naugatuck LOTOLS are used for

Tire Cord Solutions	Textile Sizing
Hose & Belting	Upholstery Fabrics
Girdles & Baby Pants	Upholstery Pads
Rug Underlay	Combined Fabrics
Balloons & Beach Balls	Adhesives
Meteorological Balloons	Masking Tape
Gloves	Non-woven Fabrics
Carpet Backing	Bag & Wrapping Paper, etc.

United States Rubber

Naugatuck Chemical Division

Naugatuck, Connecticut

BRANCHES: Akron • Boston • Chicago • Memphis • New York • Phila. • **Mfg.:** Los Angeles • Gastonia • Naugatuck • **CANADA:** Naugatuck Chemicals, Elmira, Ont.
Rubber Chemicals • Synthetic Rubber • Plastics • Agricultural Chemicals • Reclaimed Rubber • Latices • Cable Address: Rubexport, N. Y.

Rubber Age

Vol. 78, No. 6 MARCH, 1956

The Morphology of Synthetic Cis-Polyisoprene (Coral Rubber)

By ERNST A. HAUSER

Department of Chemical Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts

IN November, 1955, the Firestone Tire and Rubber Company, through Dr. F. W. Stavely, Director of the Chemical and Physical Research Laboratories, offered the first information detailing the production of a synthetic *cis*-polyisoprene *(6)*. Stavely explained that with the use of lithium as a catalyst, Firestone had been able to polymerize isoprene so that it strongly favored the formation of *cis*-1,4 structure (with a trace of 3,4) to the complete exclusion of *trans*- 1,4 and 1,2 structural arrangements. He also pointed out that such metals as potassium and sodium give primarily mixtures of *cis* and *trans* structures.

Firestone has already carried out extensive research with this new polymer, which they call Coral Rubber, including X-ray diffraction analysis, infrared spectroscopy, ozonolysis, studies of light sensitivity in comparison to *Hevea brasiliensis*, and systematic tests of the tensile strength of Coral Rubber gum stocks. In addition, compounds containing carbon black were also tested and compared with natural rubber; they gave nearly the same reinforced properties.

On December 12, 1955, one of the journals of the American Chemical Society carried a statement about polyisoprene *(1)* in which it was said that "economically, isoprene is substantially more expensive than butadiene, and purity of monomer seems more important in the polymerization. Catalysts are expensive, with lithium selling for $10.00 or more a pound. The synthetic rubber of the future is anybody's guess, but it is more likely to be a polyurethane than a polyisoprene." This may be so, at least for the time being, but this material would not give us a polymer which is absolutely comparable with natural rubber, since we are dealing here with ethyl carbamate ($NH_2 \cdot CO_2 \cdot C_2H_5$). Besides, it also seems more than questionable from a colloidal point of view whether polyurethane will exhibit the same properties or even somewhat better ones than natural rubber does.

EDITOR'S NOTE: In our previous issue, Dr. Hauser discussed the morphology of some of the newer synthetic elastomers. The current article is devoted in entirety to the morphology of Coral Rubber, one of the new cis-polyisoprene synthetics. The study shows that this new rubber is closely comparable to natural rubber both in its structure and its behavior. These studies represent the final work of Dr. Hauser, who died on February 10. An obituary on this prominent colloidal scientist will be found elsewhere in this issue.

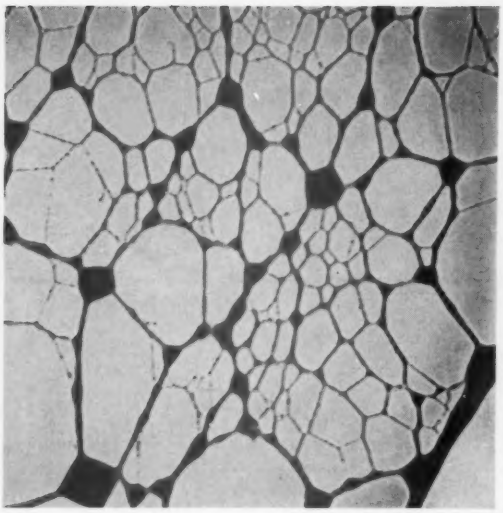


FIG. 1—Electron micrograph of Hevea brasiliensis natural rubber. (Original magnification 21,000x).

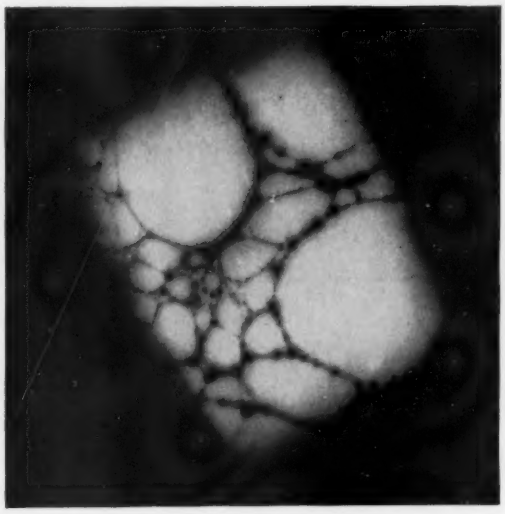


FIG. 2—Ultropak photomicrograph of pale crepe Hevea brasiliensis rubber. (Original magnification 600x).

whereas we already know now that synthetic *cis*-polyisoprene does so.

The morphology of a type of Coral Rubber in comparison with that of natural rubber has been reported in a recent article *(3)*. This article also discussed alfin-catalyzed butadiene-styrene copolymers. Firestone has kindly supplied us since with samples of various other Coral Rubbers and this paper is devoted entirely to their morphology.

Morphological Studies

Although the method of producing specimens appropriate for morphological studies of natural or synthetic elastomers has been reported previously *(2, 3, 4, 5)*, it nevertheless seems advisable to explain first how such preparations should be made, before discussing the observed morphological phenomena.

The rubber sample is first cut into very small pieces and one gram is dropped into 100 cc. of an appropriate organic solvent (e.g., benzene or toluene) in an Erlenmeyer flask. In this study, toluene was the solvent used. The flask is subjected to frequent agitation for at least 24 hours. During this time the sol fraction of the rubber goes into dispersion, whereas the gel fraction adsorbs a considerable amount of the solvent and forms a gel with it.

Before carrying out the morphological tests, the gel must be uniformly distributed throughout the entire system. The rubber dispersion is then placed on the sur-

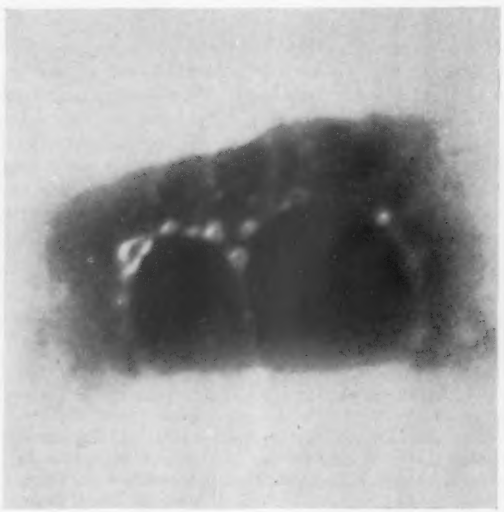


FIG. 3—Ultropak photomicrograph of milled Hevea crepe rubber. (Original magnification 600x).

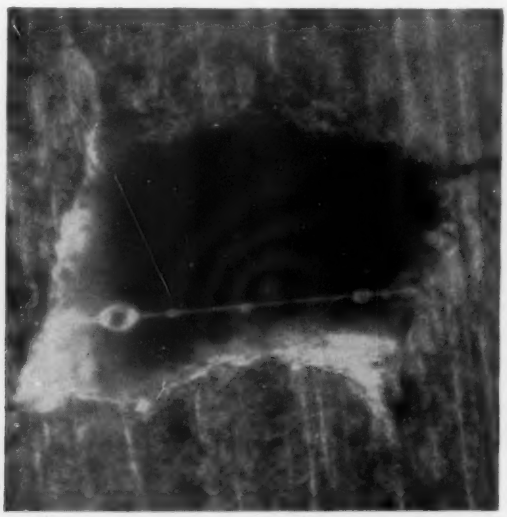


FIG. 4—Ultropak photomicrograph of milled Coral Rubber (CPP-1540). (Original magnification 600x).

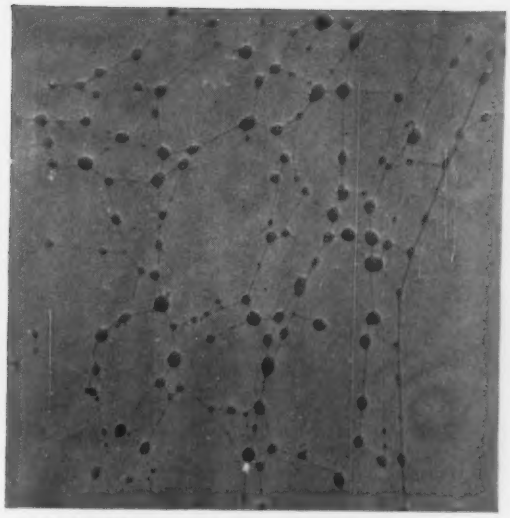


FIG. 5—Electron micrograph of Coral Synthetic Rubber (CPP-1540). (Original magnification 8200x).

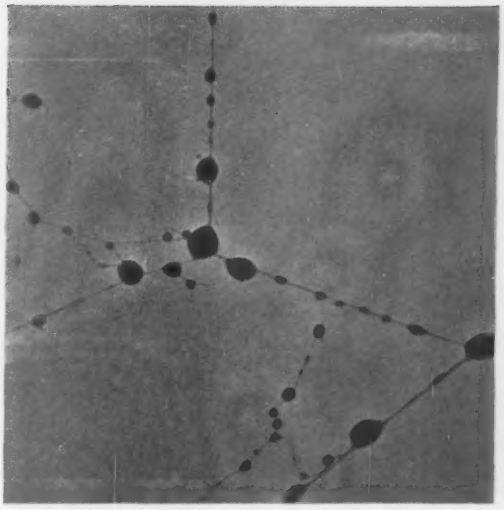


FIG. 6—Electron micrograph of the sol fraction of Coral Rubber (CPP-1540). (Original magnification 8200x).

face of water in a Petri dish in the form of one or two drops. The solvent is allowed to evaporate, and a coherent rubber film is thus formed on the surface of the water. Thereafter, fine wire gauze of at least 200 mesh is first heated over a Bunsen flame to remove any impurities present on it; with forceps, it is then immersed in the Petri dish but is not allowed to touch the rubber film. It is then slowly lifted up through the water under the rubber film and is removed with the film carried on its surface. The screen is immediately placed on a piece of filter paper to remove any excess liquid.

Now the preparation is ready to be placed in the electron microscope or under the Ultropak ultramicroscope for study. The Ultropak, of course, offers a much lower magnification than the electron microscope, but it has some advantages which the electron microscope does not, as for example allowing a continuous study of the changes a preparation undergoes with time and temperature *(3, 4)*.

A careful study of the morphology of natural *Hevea brasiliensis* crepe rubber (Figures 1 and 2) clearly indicate the presence of small films held together by broad chains and also shows many interwoven very fine threads which carry with them extremely fine globules. With the exception of the fine threads, which are due to the gel fraction of the rubber, we are dealing here with the sol fraction.

Now let us take natural Hevea crepe rubber and first subject it to milling on a standard laboratory-size rubber mill for twenty passes, having set the mill as tightly as

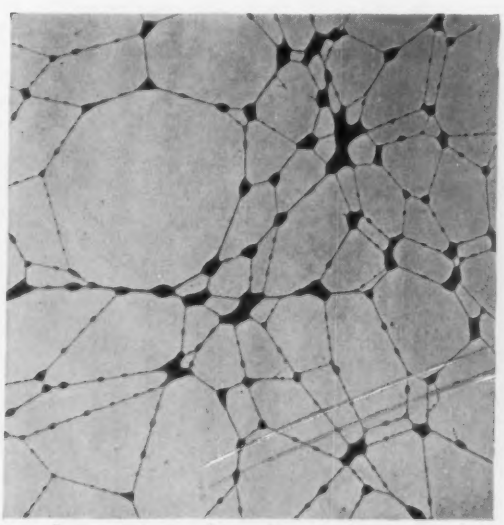


FIG. 7—Electron micrograph of Coral Synthetic Rubber (CPP-1492). (Original magnification 8200x).

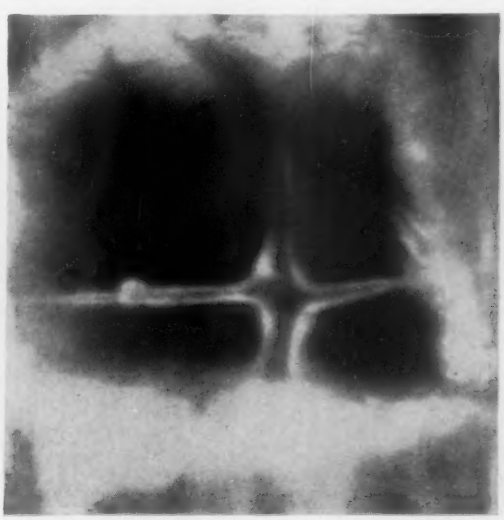


FIG. 8—Ultropak photomicrograph of Coral Rubber (CPP-1492). (Original magnification 600x).

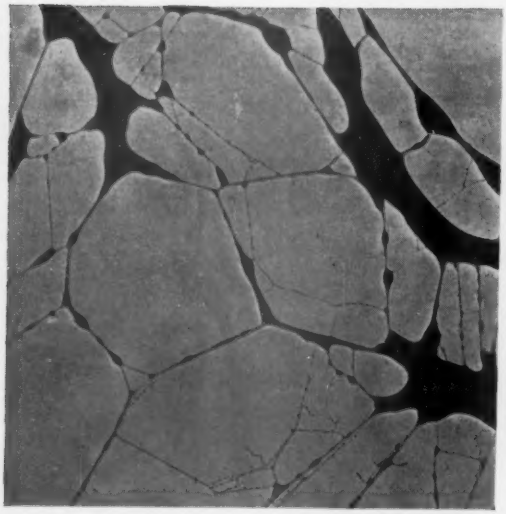


FIG. 9—Electron micrograph of Coral Synthetic Rubber (CPP-1469). (Original magnification 8200x).

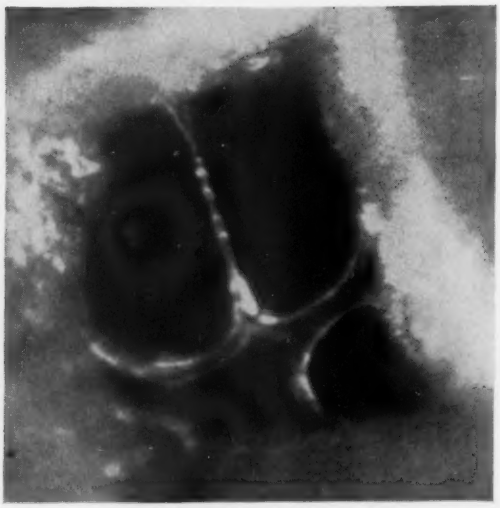


FIG. 10—Ultropak photomicrograph of Coral Rubber (CPP- 1469). (Original magnification 600x).

possible. When we disperse an appropriate amount of the milled stock in the organic solvent and then make up the sample needed for morphological studies, we immediately notice the pronounced difference between this and the unmilled sample. We are dealing here primarily with films and only extremely fine threads with a few minute globules, clearly demonstrating the effect of milling a rubber sample (Figure 3). Probably due mainly to oxidation, we have more sol rubber than we had in the original sample, and for this reason the rubber becomes more plastic and less elastic during milling.

If we now take a sample of Coral Rubber (CPP-1540) and subject it to the same milling procedure we obtain the morphological picture shown in Figure 4. Figures 5 and 6 show the same preparation before milling, Figure 6 revealing the morphology of the sol fraction. We have again produced a reaction similar to that discussed for Hevea rubber.

One sample of Coral Rubber (CPP-1492) shows negligible gel characteristics *(6)*. The electron micrograph of this preparation clearly demonstrates the presence of some pronounced films and a few fine threads interspersed with a few globules (Figure 7). This is also revealed in studying this product with the Ultropak, which shows one fairly broad band and one thread (Figure 8).

In September, 1955, Firestone sent Polymer CPP-1469 to about twenty rubber companies and universities which had been participating in the Government's syn-

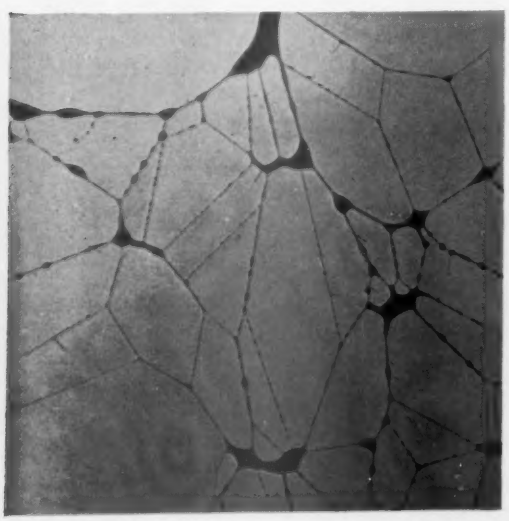


FIG. 11—Electron micrograph of Coral Synthetic Rubber (CPP-1543). (Original magnification 8200x).

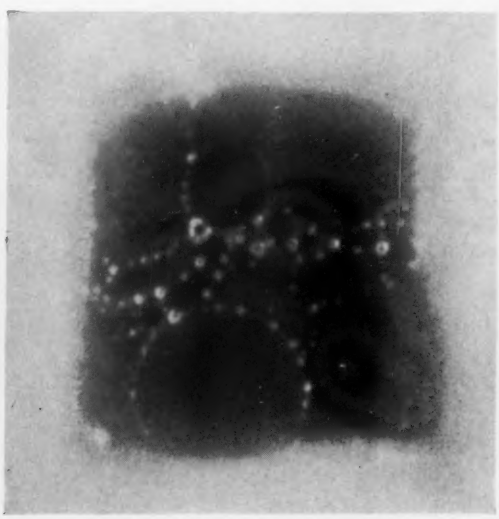


FIG. 12—Ultropak photomicrograph of Coral Rubber (CPP-1543). (Original magnification 600x).

thetic rubber research program. This polymer exhibits a morphology of a few very fine thin threads and a few small globules, as can be seen in Figure 9; the same morphology is shown in the Ultropak photomicrograph of Figure 10.

The morphology of Coral Rubber CPP-1543 is shown in the electron micrograph of Figure 11 and the Ultropak micrograph of Figure 12. These pictures offer for the first time clear visual proof that the new synthetic *cis*-polymer of isoprene is not only comparable with natural Hevea rubber in its X-ray diffraction pattern and other tests, but is also comparable in its morphology. Until now we have not been able to produce a synthetic elastomer which shows a morphology even comparable to natural Hevea rubber. What this means has already been proved by the many tests which have been carried out with rubber articles made from this new synthetic *cis*-polyisoprene.

Conclusions

Through basic research, the Firestone Tire and Rubber Company has now made it possible to produce synthetically a polyisoprene exhibiting the *cis* configuration, thereby offering a synthetic rubber which is not only chemically but also in its physical properties absolutely comparable to natural *Hevea brasiliensis* rubber. Firestone has already offered proof that this is the case, through X-ray diffraction studies and several other methods. For the first time, however, detailed morphological studies of these new products have been carried out and their morphology compared with that of natural *Hevea brasiliensis* crepe rubber. These studies show that the two elastomers are absolutely comparable in their morphologies as well.

ACKNOWLEDGMENTS

The author wishes to thank Dr. F. W. Stavely of the Firestone Tire and Rubber Company for supplying him with the samples which made this investigation possible. Special thanks are also due Dr. Cecil E. Hall of the Department of Biology, Massachusetts Institute of Technology, for the electron micrographs used in this work and for his continuous cooperation. The author is grateful to Mr. Z. A. Foroulis for his help in making up the morphological preparations, and expresses his thanks to Miss Laura W. Hill for assisting him in the ultraphotomicrographic work.

LITERATURE REFERENCES

(1) "Research," *Chem. Eng. News*, Vol. 33, p. 5411 (1955); Vol. 34, p. 23 (1956).

(2) Hall, C. E., Hauser, E. A., le Beau, D. S., Schmitt, F. O., and Talalay, P., *Ind. Eng. Chem.*, Vol. 36, p. 634 (1944).

(3) Hauser, E. A., *Rubber Age*, May, 1950; April, 1955, and February, 1956; *Kautschuk und Gummi*, p. 120 (1953); p. 285 (1954).

(4) Hauser, E. A., and le Beau, D. S., pp. 356-406 in Vol. VI of Alexander's "Colloid Chemistry," Reinhold Publishing Corp., New York (1946); also, *India-Rubber J.*, Vol. 110, p. 169 (1946); Vol. 111, p. 453 (1946); *J. Phys. Coll. Chem.*, Vol. 54, p. 256 (1950).

(5) le Beau, D. S., and Hauser, E. A., *Rubber Age*, April, 1946.

(6) Stavely, F. W., "A *Cis*-Polyisoprene Having the Molecular Structural Features of Hevea Rubber," paper presented before the Division of Rubber Chemistry, American Chemical Society, Philadelphia, Penna., November 3, 1955 (in print); also, private communication.

Low Cost Method of Making Rubber and Plastic Molds

A NEW heat-resistant material for the design and manufacture of low cost components for many industrial uses is currently being marketed by the Chemical Development Corporation of Danvers, Mass. Called Devcon C, it is a combination of approximately 80% aluminum and steel and 20% plastic, and it can be poured or formed into any shape. Intended primarily for making molds for the rubber, plastic and allied industries, it also finds application in embossing dies, tools, jigs and fixtures, filling holes in castings, caulking around steel plates, and generally where high strength at elevated temperatures is essential.

Devcon C is said to be extremely tough. It is lightweight and similar in many respects to aluminum. It has very good heat resistance and has a compression strength of over 5,000 p.s.i. at 400°F. There is practically no shrinkage or distortion during hardening. Once hard, it is permanent and will not deteriorate or change. It can be drilled, ground, threaded or machined with regular metal working tools. It has good heat transfer. If quick heating or cooling is essential, a small coil for steam or cold water can be imbedded in the material before it hardens.

According to Chemical Development, molds for rubber and plastics products can be made with Devcon C very easily in a matter of only a few hours working time. Many plastic and rubber products—never possible before because of the high mold cost, excessive time required to build the die or other reasons—can now be put into production quickly and inexpensively. Little or no machining or finishing of the mold is generally required. A model, made of wood, plaster of Paris, or practically any other material can be used. The Devcon C is simply poured and formed around the model. When hardened, the final surface of the die will be a precision reproduction of the model itself.

Devcon C and hardening agent are being poured into box around model. Every detail on the model will be reproduced.

Gauge Control in Calendering of Vinyl Films and Sheeting

By M. JUKICH

Manager of Design, Plant Engineering Division, Goodyear Aircraft Corp., Akron, Ohio

FIVE or six years ago we, at Goodyear, were faced with the problem of increasing our facilities for the production of vinyl film and sheeting. Our first consideration was to get the best equipment available. The new calender and train had to be able to handle all the usual production problems. One of the more serious of these was a better method of getting good transverse film gauge or profile. Historically, then as now, a plus or minus 5% variation from nominal gauge was allowable. Yet it was a well-known fact that good rolls of film could not be wound up if profile variations of such magnitude were tolerated. And as the various uses of vinyl film were broadened, profile irregularities had to be reduced continuously.

Methods of Profile Adjustment

At that time, several methods for controlling stock profile were in general use. First was the application of a suitable crown to the rolls. Second, the use of a good temperature control system. Third, the use of a cross axis arrangement on the gauging rolls. Fourth, the use of the Beta Ray type of thickness gauge.

Suitable roll crown can be calculated fairly close. However, it is practically impossible to obtain such a crown without extensive profile honing in the regions as indicated by the film profile. Even after a good crown is obtained, any change in calendering conditions will invariably still produce a poor profile. These changes, even though sometimes minor, usually cannot be avoided. They are changes in formulations, in gauge, in width, in calendering speed, etc. At times, even minor temperature variations in the mixing or calendering of the same formulation will result in a change of profile. Basically, these changes result in a change of the separating forces between the rolls. The separating forces in turn produce a deflection in the rolls. Actually, then, it is to overcome this deflection that we grind a crown into the rolls.

Trying to maintain good stock profile with a fixed crown is a continuous problem. There are, however, several possible solutions. One is to change rolls when calendering conditions change. The other is to eliminate the changes by having sufficient calenders available to operate each over a very narrow range of stocks. The first solution greatly limits the volume of production. Very few of us are fortunate enough to afford the second. At this point, I believe it is apparent that fixed crown on the rolls can not be considered the real solution to the problem of profile control.

A circulating hot water system combined with the use of drilled calender rolls was considered to be the best method of controlling stock temperature. Such a setup provides a uniform temperature across the full face of the rolls. This eliminates any profile variation

Note: This article is based on a paper presented by the author before the Society of the Plastics Industry, New York, December 7, 1955.

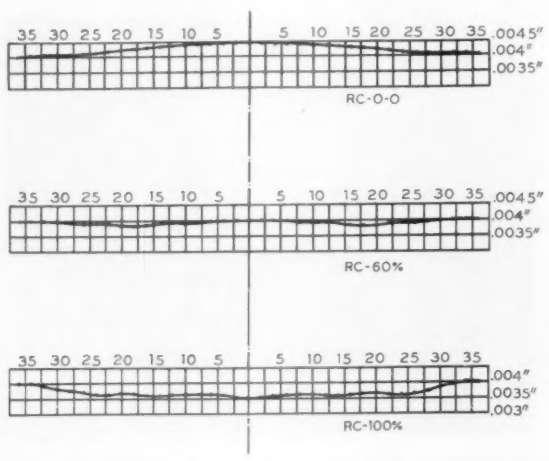


FIG. 1—Effect of roll cross. (72-inch x .004-inch film; 32-inch x 92-inch calender).

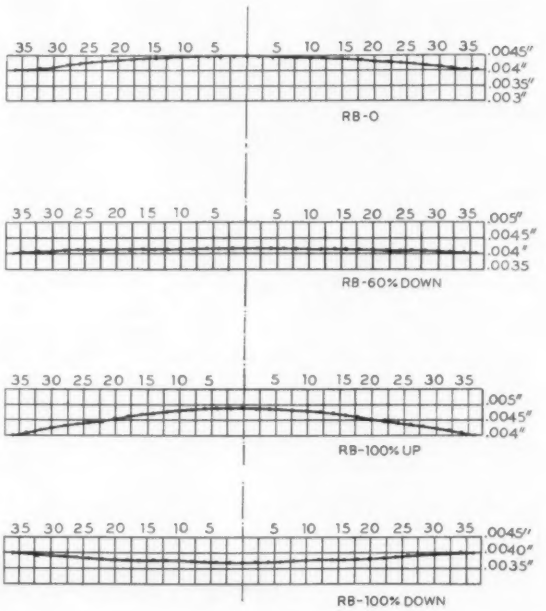


FIG. 2—Effect of bending bottom roll only. (72-inch x .004-inch film; 32-inch x 92-inch calender).

that might result otherwise. This type of control also permits the rapid increase or decrease of stock temperatures. Such manipulation of stock temperatures affects their plasticity and allows some profile regulation. However, experience has actually shown that only minor temperature changes are really possible, usually less than 8°. This range is narrow because of both material and processing limitations. Too low a temperature results in cold checks while too high a temperature produces processing problems such as poor stripping. Thus, it is obvious that temperature manipulation does not provide sufficient control for adequate profile adjustment.

Cross axis was the best known and most widely used method of varying the profile of the gap between a pair of rolls. Such an arrangement of the gauging rolls can certainly be advantageous. This is especially true in the calendering of heavy films and sheeting where the amount of crown variation required is quite large, although not of a critical accuracy.

This brings us face to face with one of the deficiencies of cross axis. The correction curve it produces is not parallel to the actual roll deflection curve. This can result in a stock profile known in the industry as "oxbow," that is, nominal gauge at the ends and center of the sheet with light gauge in between. This deficiency is not a serious problem in the production of heavy films and sheeting. However, in our opinion, it does become serious when calendering light gauge films, since it becomes more pronounced as gauge is decreased. In other words, it produces the least satisfactory profile correction on light gauge films where, unfortunately, the smallest amount of profile irregularity can be tolerated.

Another much less serious deficiency of cross axis is the lack of any possibility of reducing roll crown. Crown can be increased but not decreased. This means you must accurately determine your minimum crown requirements. Then, should your calendering conditions change to the extent of requiring less crown, you may have to change rolls. On the other hand, starting out with too low a crown results in a reduced range of possible crown correction. Figure 1 shows this effect.

A beta ray type of gauge can be invaluable from the standpoint of indirectly helping in profile control. It provides an instantaneous indication of stock profile, permitting rapid adjustments. This is specially true of installations using double traversing pickups so as to provide readings across the full width of the sheet.

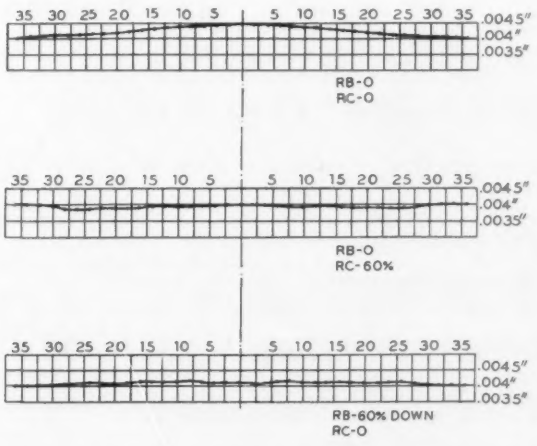


FIG. 3—Effect of bending bottom roll only. (72-inch x .004-inch film; 32-inch x 92-inch calender).

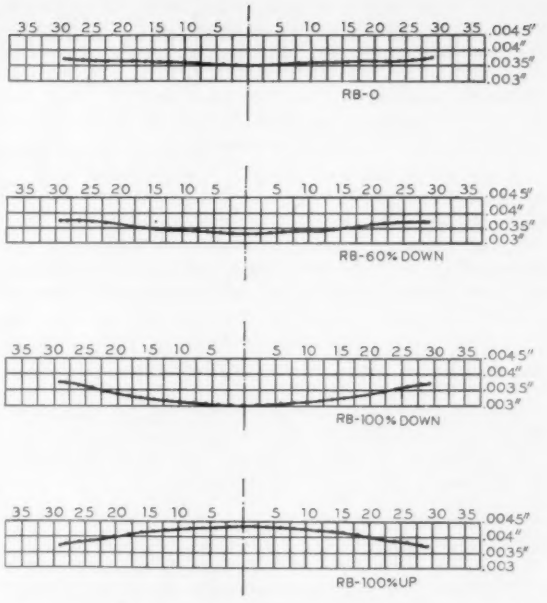


FIG. 4—Roll bend bottom roll. (58-inch x .00375-inch film; 24-inch x 68-inch calender).

Roll Deflection Control Essential

Careful consideration of all of these methods of profile adjustment resulted in several conclusions. First, all were helpful. Second, none were entirely adequate whether used singly or in combination. All lacked the basic ability to provide a control of the variation in roll deflection. In other words, to provide good profile control you must be able to control the variation in roll deflection. This is necessary since variations in roll deflection are caused by variable separating forces as produced by changes in calendering conditions.

Since calendering changes ordinarily cannot be eliminated, we reasoned it was necessary to compensate by controlling the variation in roll deflection through some external means. Logically, we concluded this meant applying external forces to the roll necks out beyond the journal areas. We knew these forces must be controllable in magnitude and direction since it is necessary to be able to reduce roll crown as well as to be able to increase it.

Having gone this far, we were temporarily stopped, since thorough knowledge of roll and calender design were now essential. It was also necessary to determine the magnitude of the required external forces. After considerable engineering study, we arrived at a rough approximation of the magnitude of this force. At that point, we decided to discuss the entire problem with the Adamson United people whom we knew to be one of the recognized authorities in calender design. As we had expected, their original reactions were extremely cautious, if not somewhat negative. This was understandable since the idea was quite radical. After considerable discussion and study, the problems were eliminated one by one. Finally, we agreed the proposal had sufficient merit to warrant a trial on our new calendering unit.

Accordingly, the new calender was ordered complete with cross axis, a hot water circulating temperature control, beta ray gauges and a roll bending unit (as we had decided to call this new device.) The entire unit was

placed in operation less than a year later. Immediately, the value of the roll bending device became apparent. We now had a method of more accurately controlling stock profile and the correction was pleasingly accurate for light gauge films (see Figures 2 and 3). Not only that, it was effective in both directions. Crown could be added to or reduced as necessary.

Nonetheless, we restrained our enthusiasm with the knowledge that only time could provide us with the complete answer. We were still concerned with the possibility of excessive bearing wear and roll fatigue. Months later, when the rolls were removed for a regrind job, we were pleased to find that only normal wear had occurred.

Having proven the value of this unit through usage, we decided to consider an installation for one of our existing calenders. The Adamson people were again called in. This time we asked that greater amounts of bending force be available. This would permit us to either bend more crown into the roll or to reduce more of the existing crown as necessary.

A short time later, and after a shut-down of less than a week, the unit was ready for trial. It worked out just as planned. We now had equipment which provided our production people with the means of an even greater range of crown adjustment (see Figure 4).

As a matter of information, there are now five roll bending units in operation on various calenders within the industry. In addition, many more units are presently contemplated or are on order. For those in operation, reports from the field indicate complete satisfaction and successful results from each.

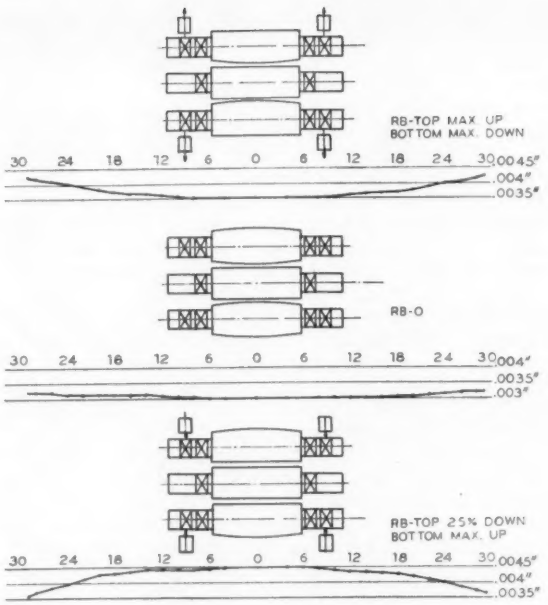


FIG. 5—Effect of roll bending. (58-inch x .00375-inch film; 24-inch x 68-inch calender).

Conclusion

Although pleased with the results of our efforts to date, we have not become static. To the contrary, we are going a step further in our attempt to achieve the ultimate in profile control. Recently, we installed a bending unit for the top roll of one of our calenders. Thus, we now have a calender equipped with roll benders on both the top and bottom rolls. We hope to be able to produce not only a flatter sheet, but also to increase the range of gauges and formulations that can be run on a single calender. Some of our results to date are shown in Figure 5.

Coming Next Month...

"Electrical Potentials in Rubber Compounding"—by R. S. Havenhill, L. E. Carlson, and J. J. Rankin, St. Joseph Lead Co., Monaca, Penna.

Includes a comprehensive discussion of rubber reinforcement in which electrical charges, or contact potentials, play an important role. The "Electrostatic Modulator", an instrument by which a Banbury operator can follow the mixing operation and evaluate the uniformity of the batch during the mixing cycle, is also discussed.

"The Measurement of Volume Resistivity of Plasticized Polyvinyl Chloride"—by C. E. Balmer and R. F. Conyne, Rohm & Haas Co., Philadelphia, Penna.

An illustrated description of a test procedure for the determination of volume resistivity of molded slabs of plasticized PVC. The test, which is relatively simple, requires a small amount of test compound, and gives good reproducibility of results.

"Rubber Meets the Challenge of Modern Transportation"

Report of a symposium sponsored by the Akron Rubber Group in which representatives from the aircraft, automotive and rubber industries discussed the role of rubber in modern, high-speed transportation.

"Application of Large A-C Motors to Rubber Mill Drives"—by C. E. Buchan, Electric Machinery Manufacturing Co., Minneapolis, Minn.

An analysis of the large power requirements special to milling and mixing rubber. Such factors of the motor and control as horsepower, protection of motor insulation, and safety stopping are included in the article.

Plus several short practical articles.

Ultra Accelerators in CV Vulcanization

By L. A. BROOKS, J. L. TRONSON and A. C. ROWLEY
Rubber Division, R. T. Vanderbilt Co., East Norwalk, Conn.

WHEN continuous vulcanization of wire insulations was first developed about 25 years ago, it was found that the types and amounts of acceleration used for conventional cures were not fast enough for the short cure times required, even at 200 pounds per square inch of steam pressure or over. The problem resulted in extensive development work, much of which had to be done on factory equipment because of the lack of appropriate laboratory devices such as flash vulcanizers and Mooney plastometers. The complete story of the work done in various factories and laboratories would be very interesting if it could be fully compiled.

In general, the work followed two lines: (1) The use of increased amounts of acceleration up to the point where additional increments result in no gains in speed, or where they resulted in adverse effects on other properties of the compound, and (2) The use of two and three-way combinations of different accelerator types which would activate each other. A large volume of work has been done in this direction but, because of its empirical nature, there are still many unexplored possibilities.

The most important limitation on any acceleration was its scorch rate at processing temperatures. The problem was to use not the fastest acceleration possible but the fastest feasible combination which would not scorch under a given set of manufacturing conditions. These conditions, of course, varied from plant to plant and resulted in the adoption of a variety of accelerator systems.

Two innovations, namely, the use of refrigerated water for equipment cooling, and the use of cold compound feed to the extruder, have greatly increased freedom from scorched stocks, which tend to increase the range of curing and tubing speeds. However, much is still to be gained through the use of proper accelerators and their combinations.

Widely Used Accelerations

Over a period of years, the most widely used accelerations have consisted of combinations of thiazoles, such as mercaptobenzothiazole (Captax) and 2-benzothiazyl disulfide (Altax) and the ultra-accelerators. By ultra-accelerators we mean thiuram monosulfide (Unads) and the disulfide (Tuads) and certain metal salts of the latter type, i.e., the dithiocarbamates (Zimate, Ledate, Bismate, etc.). The ratios have ranged from 1 to 3 of thiazole to one of ultra, although in many cases a higher ratio of ultra has become desirable. Significantly, we now witness increasing reliance on the ultra-accelerators as primaries, with the thiazoles being used as secondary or modifying accelerators.

Originally, mercaptobenzothiazole was the commonly used thiazole. It has largely been replaced by its zinc salt (Zetax) and by 2-benzothiazyl disulfide for reduced scorchiness.

When CV cures were first developed, the ultras available were the thiuram monosulfide and disulfide plus the zinc and lead salts of the latter (Zimate and Ledate, respectively). Because of their vulcanizing activity, the dimethyl and the diethyl dithiocarbamates have been used almost exclusively.

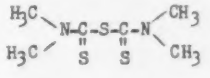
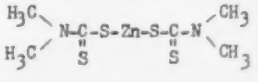
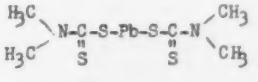
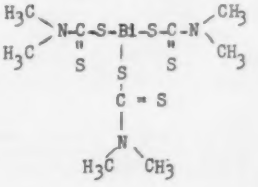
Unads is often used in spite of its slower curing speed because of its relative freedom from scorch. The Zimates are widely used in a variety of combinations, but because of their activity at processing temperatures, they are frequently modified with Altax which inhibits the activity of the ultra at low temperatures without greatly changing the ultimate curing speed. Ledate has some of the advantages of both Unads and the Zimates, but will darken the compound during cure.

In recent years, lead and bismuth dithiocarbamates (Ledate and Bismate, respectively) have become of primary importance because of their high activity at CV curing temperatures. By using them, a higher temperature coefficient of vulcanization is obtained than with the other ultra-accelerators.

For sulfurless or low-sulfur cures, designed for super-aging characteristics, Tuads and selenium dimethyl dithiocarbamate (Selenac), usually activated with Ledate or Zimate, are frequently used. The Selenac is much faster than Tuads and is, therefore, more interesting for CV compounds of this type. In general, the dimethyl derivative is more active than the corresponding diethyl compound.

In three-accelerator combinations, much work has been done with thiazole-ultra-litharge mixtures as well

TABLE I—ACCELERATORS EXAMINED

Name	Molecular Weight	Melting Point (°C.)	Structural Formula
Unads	208	105	
Methyl Zimate	305	250	
Ledate	447	320	
Bismate	569	230	

Note: This paper was presented before the Fourth Annual Wire and Cable Symposium, Asbury Park, N. J., December 6-8, 1955.

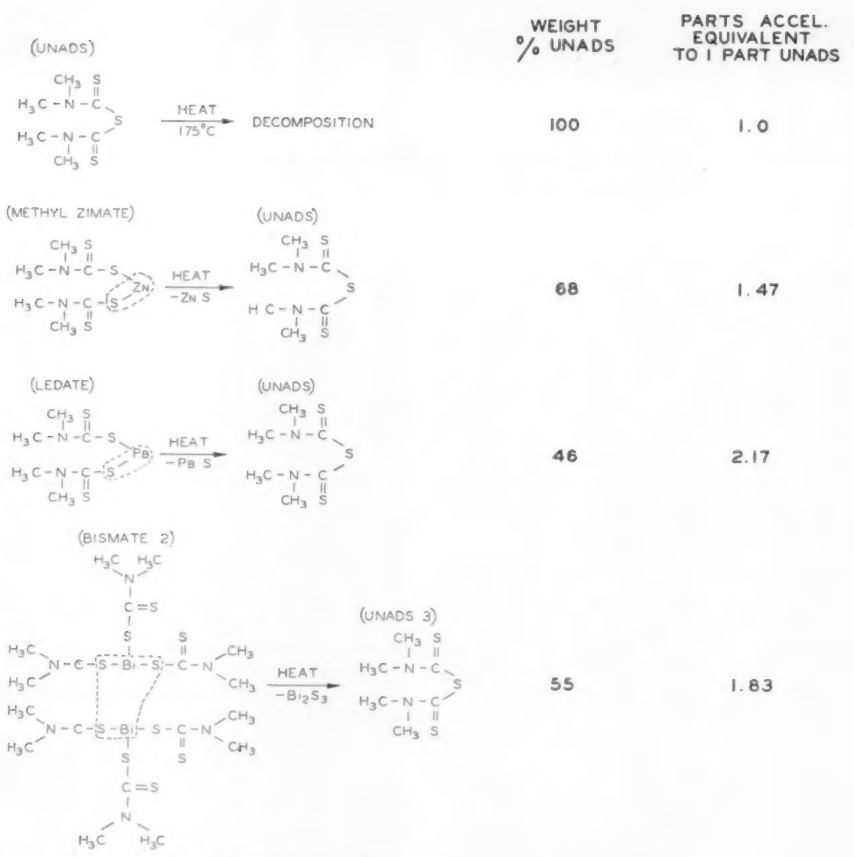


FIG. 1—Chemical structures of accelerators.

as with combinations of thiazole plus two ultras, but there are large numbers of blends yet to be investigated.

The compounders' choice of accelerator system for a given stock depends upon a variety of factors, such as cost, speed of cure required, available steam pressures, specified physicals, aging, electricals, color, staining, and other characteristics, as well as the factory processing conditions and predictable heat history. By taking all of these factors into consideration, he may narrow down his choice of chemicals, and then begin his laboratory exploration involving the design and evaluation of experimental compounds.

In this work, the investigator should employ processing conditions and especially temperatures that simulate as nearly as possible those in the factory mixing and curing equipment.

It has been known for years that a comparison of cure rates of two or more compounds at, for example, 300°F. (149°C.), does not necessarily give the same relative results as at CV temperatures of 350°F. (177°C.) and over. This fact should be given more consideration. It has, in fact, prompted the work to be reported in this paper.

TABLE II—GR-S JACKET COMPOUND

(Specific Gravity—1.56)

GR-S 1503	100.0
Reogen [1]	5.0
Stearic Acid	1.5
Zinc Oxide	5.0
Agerite Resin D [2]	2.0
Agerite White [3]	0.5
Anti-Sun-Checking Wax	4.0
Hard Hydrocarbon	30.0
Philblack A	40.0
P-33	40.0
	228.0

(1) Mixture of an oil-soluble sulfonic acid of high molecular weight with a paraffin oil. (2) Polymerized trimethyl dihydroquinoline. (3) Sym. di-beta-naphthyl-para-phenylene diamine.

Theoretical Considerations

The accelerators chosen for examination are shown in Table I. The structural formulae show the interrelation between Unads and the other three, Zimate, Ledate, and Bismate.

Considering the chemical structures of these accelerators, it may be postulated that in all cases there could be a formation of Unads under certain thermal conditions with the splitting out of the corresponding sulfide as illustrated in Figure 1.

In an attempt to obtain evidence in support of this liberation of Unads from these accelerators, a series of cable jacket compounds containing equal molar amounts of these various chemicals were mixed and tested, and compared to one having one part of Unads. The base compound is shown in Table II. The vulcanizing sys-

TABLE III—VULCANIZING SYSTEMS EVALUATED AND TEST RESULTS

	1	2	3	4
Jacket Base	228.0	228.0	228.0	228.0
Sulfur	2.0	2.0	2.0	2.0
Unads	1.0	—	—	—
M. Zimate	—	1.47	—	—
Ledate	—	—	2.17	—
Bismate	—	—	—	1.81

Stress at 200% (S)—Tensile (T)—Elongation (E)

Open Steam Cures at 250°F.	1 S	1 T	1 E	2 S	2 T	2 E	3 S	3 T	3 E	4 S	4 T	4 E
30 Minutes	—	—	—	300	1400	900**	—	—	—	120	400	1150
45 Minutes	120	300	960	460	1700	700	100	100	940	200	1000	1100
60 Minutes	220	600	720*	480	1720	670*	100	100	820	200	1200	920*
90 Minutes	660	1800	560**	600	1640	540	100	100	800	420	1840	770**
at 310°F.												
2 Minutes	—	—	—	420	1740	700**	—	—	—	360	1780	780**
4 Minutes	560	1660	630*	460	1760	680	—	—	—	440	1920	680
7 Minutes	560	1860	610**	480	1780	630*	160	720	1220	640	1960	600
10 Minutes	560	1820	580	500	1780	630	220	1340	1010	640	1980	560*
20 Minutes	560	1760	550	500	1680	600	260	1480	930*	680	1900	520
30 Minutes	540	1720	600	500	1660	590	420	1840	760**	700	1880	520
45 Minutes	520	1660	600	500	1580	570	440	1840	720	700	1860	500
at 397°F.												
5 Seconds	—	—	—	—	—	—	—	—	—	—	—	—
7½ Seconds	—	—	—	—	—	—	—	—	—	300	1600	810**
10 Seconds	220	1000	900	220	1240	1010	180	1100	1080	500	2000	660
15 Seconds	340	1740	870**	300	1600	870	280	1700	880**	500	2000	620
20 Seconds	420	1880	730*	360	1860	810**	360	1840	730	580	2040	590
30 Seconds	440	1880	680	380	1900	780*	400	1900	690	600	2060	580*
45 Seconds	440	1840	680	360	1820	750	440	1920	680*	580	2060	570

* Maximum Tensile Data. ** Maximum Tensile Product Data.

tems evaluated appear in Table III, along with the test results. Open steam cures were made in the flash vulcanizer at three different temperatures, namely, 250, 310, and 397°F. (121, 154, and 203°C., respectively). [The data indicated by the single asterisk correspond to the development of maximum tensile; the double asterisk indicates the maximum tensile product (tensile x elongation) for each temperature.]

The data show no distinct correlation between the four accelerators, either in rate of vulcanization or in the physical properties ultimately developed. The differences in activity of the accelerators with respect to each other change markedly with temperature. For example, Zimate is fastest at 250°F. (121°C.) and slowest at 397°F. (203°C.) as judged by maximum tensile product.

That there is no correlation indicates that there is little, if any, decomposition to Unads during the vulcanization reaction, although such decomposition probably does occur at certain temperatures in dry heat and in the absence of rubber. On the contrary, in fact, Craig et al *(1)* have shown that when Tuads is cured in the presence of zinc oxide, Unads, formed as an intermediate, reacts with the excess zinc oxide to produce Zimate. It may be recalled that their semi-cured stocks showed a high percentage of Unads that could not be detected analytically in either the early or the final stages of vulcanization. Thus, the Zimate is probably the ultimate stable form of either the Tuads or Unads accelerator system and would not be likely to decompose to Unads when used as the original accelerator.

Another possibility that suggests itself is that Zimate may likewise be the ultimate form of a Bismate or Ledate system. This possibility was examined because of the frequent observations of a discoloration in white stocks that had been cured by either of these accelerators which was attributed to the formation of lead or bismuth sulfides. Such sulfides might also result by the displacement of the lead or bismuth from their dithiocarbamates by zinc (i.e., via zinc oxide) which, in turn, react with free sulfur in the rubber compound to form the markedly insoluble sulfides.

Therefore, several stocks were prepared with excessive amounts of Ledate and Bismate, respectively, and of zinc oxide. Samples were heated in open steam in the flash vulcanizer at 397°F. (203°C.) followed by acetone extraction and analysis of the extracts for soluble zinc compounds. [Standard mixed-color methods for determination of zinc by dithizone reagent, in the presence of different metals *(2)*].

Table IV shows the results obtained. When sulfur is present and vulcanization takes place, a definite small amount of Zimate appears to be formed. In the absence of sulfur, hardly a trace of soluble zinc is detectable.

TABLE IV—ZINC CONTENT OF STOCKS CONTAINING EXCESSIVE AMOUNTS OF LEDATE AND BISMATE

	1	2	3	4	5	6	7
Pale Crepe	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Stearic Acid	2.0	—	2.0	—	2.0	—	2.0
Zinc Oxide	10.0	10.0	10.0	10.0	10.0	10.0	10.0
MPC Black	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Sulfur	2.5	2.5	—	—	2.5	2.5	—
Ledate	5.0	5.0	5.0	5.0	—	—	—
Bismate	—	—	—	—	5.0	5.0	5.0
Zinc Content of Acetone Extract, Per Cent of Original Compound							
Open Steam At 397°F.							
15 Seconds	0.025	0.015	0.000	0.000	0.025	0.025	0.003
90 Seconds	0.032	0.025	0.000	0.000	0.025	0.025	0.003

FIG. 2—Bismuth trisulfide.

That the zinc is in the form of Zimate rather than zinc stearate or other soaps is supported by the fact that elimination of stearic acid from the formula does not significantly reduce the amount of zinc found. The evidence that a small amount of Zimate is formed strengthens the belief that the discolorations observed with Ledate and Bismate are due to the formation of traces of sulfides of these metals when normal dosages of the accelerators are used.

In the case of Bismate, the discoloration is not severe and in some cases does not occur. It has not been possible to characterize the discoloration to date, but it could be attributed to combinations of trace amounts of bismuth sulfides and oxides. A survey of the chemistry of bismuth *(3)* discloses that many complex oxides have been reported and that several have not been characterized with certainty. Most of them are dark colored. The possible formation of a bismuth oxy-sulfide, i.e., Bi_2O_2S, has been indicated. This compound has not been recorded in the literature but could result from the reaction of zinc oxide with Bismate. Such a reaction is shown in Figure 2. Bismuth tri-sulfide has the structure:

$$S = Bi—S—Bi = S$$

By analogy, if one molecule of Unads were to split from the Bismate by thermal decomposition and the residual bismuth compound reacted with zinc oxide to form two molecules of Zimate, the resulting bismuth end product would be Bi_2O_2S, which would probably be dark colored, contributing to discoloration even if formed in small amounts.

The fact that very little Zimate is formed in any of these reactions, either with Bismate or Ledate, indicates a marked stability for both of these accelerators, and apparently shows that they function in rubber in the form of stable compounds, rather than dissociating readily into free radicals.

Upon examining the metals from which Bismate and Ledate are derived, it is extremely interesting to note that bismuth and lead are side by side in the periodic table of elements as indicated in Table V. Both are Group B metals, and both are in Series 6. Their atomic weights are 207.2 for lead and 209 for bismuth. The main distinction between the two elements is that lead is in Group 4 with a common valence of 2 and bismuth is in Group 5 with a common valence of 3. From these positions then, it follows that the lead is more basic than bismuth, and a salt derived from lead would be more stable thermally than the corresponding bismuth salt. Thus, Ledate melts at 320°C. and Bismate at 230°C. (with decomposition). This probably explains to some extent the relatively lower activity of Ledate at both processing and curing temperatures of rubber compounds.

In passing, it should be mentioned that when Bismate was first developed a related material, namely, bismuthyl dimethyldithiocarbamate, was also prepared and evaluated:

TABLE V

(Abstract from the Periodic Table of Elements)

	Lead	Bismuth
Symbol	Pb	Bi
Atomic No.	82	83
Atomic Weight	207.2	209
Group	IV B	VB
Series	6	6
Valence	2, 4	3, 5

TABLE VI—TEMPERATURE VS. TIME TO "OPTIMUM" CURE

Cure Temperature (Degrees F)	(°C)	Bismate (Minutes)	Methyl Zimate (Minutes)	Unads (Minutes)	Ledate (Minutes)
250	(121)	66	54	90	90+
287	(142)	16.3	16.0	15.7	60.0
310	(154)	3.0	3.0	5.0	12.0
350	(177)	0.483	0.883	0.933	1.35
397	(203)	0.172	0.317	0.272	0.300

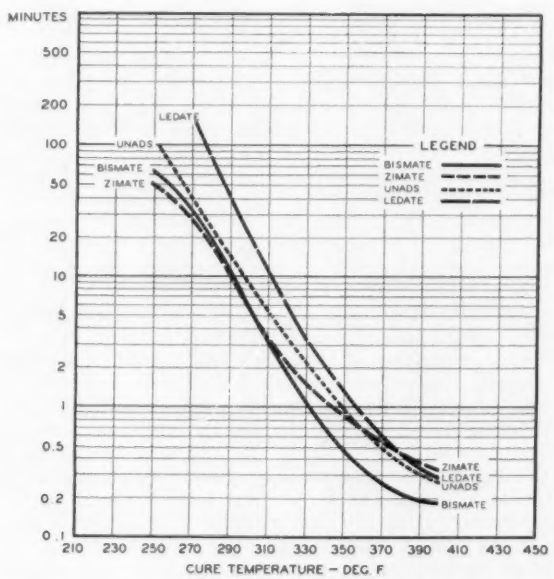
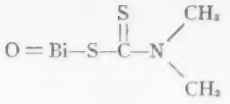


FIG. 3—Relationships between accelerators at various temperatures.



This was a bright lemon yellow material that acted as an accelerator. However, because of the fact that it was less active at curing temperatures than Bismate, and since the expensive bismuth carried only one-third as much dithiocarbamate as in the case of Bismate, the material was considered of no commercial interest.

Applications

In order to show in a practical way the relative performance of four ultra-accelerators under different vulcanizing conditions, an experiment was designed in which the same amount of each accelerator—one part per hundred of rubber—was added to the base jacket compound (Table II), again using two parts of sulfur in all cases.

The stocks were vulcanized in the flash vulcanizer for ranges of cure times at 15, 40, 63, 120, and 225 psi open steam, corresponding to the temperature of 250, 287, 310, 350, and 397°F., respectively (121, 142, 154, 177, and 203°C., respectively). The cured specimens were measured for modulus at 200%, tensile, and elongation at break. For each stock and at each cure temperature, an "optimum" time of cure was estimated based on a composite of time to reach maximum tensile product, and points of inflection of the time-tensile and time-modulus curves.

The reason for choosing these criteria for establishing "optimum" vulcanization time was that, in general, the time-tensile or time-modulus curves had very flat plateaus, or continued to rise gradually, rather than showing maximum values at realistic times of cure. It was found that maximum tensile-elongation product for each range of cure times usually occurred at a time closely corresponding to that at which the time-tensile and time-modulus curves changed from a steep rise to a slow rise or a plateau. These composite "optimum" times of cure versus temperature are shown in Table VI.

Plotted on semi-log paper (time on log scale), the data (Figure 3) show more clearly the relationships between the accelerators at the various temperatures. The slope of each curve is an indication of the temperature coefficient of vulcanization for the corresponding accelerator. Bismate and Ledate show steeper curves at high temperatures than Zimate and Unads, indicating greater increase in cure rate with increase in temperature for the former than for the latter types. The Ledate differs from Bismate in being displaced toward longer cure times, or slower cures.

Table VII—Comparative Aging of GR-S Jacket Stock

(4 Day Oxygen Bomb at 70°C.)

	Bismate	Zimate	Unads	Ledate
Optimum Cures at 287°F.				
Time of Cure (Mins.).....	15	15	15	60
Unaged				
Tensile (p.s.i.)	1940	1740	1740	1600
Elongation (%)	630	650	570	900
Aged				
Tensile (% Retained)...	1760–91%	1660–95%	1500–86%	1440–90%
Elongation (% Retained)	560–89%	580–89%	480–84%	780–87%
Optimum Cures at 397°F.				
Time of Cure (Secs.).....	10	20	15	20
Unaged				
Tensile (p.s.i.)	1820	1700	1600	1600
Elongation (%)	750	820	880	900
Aged				
Tensile (% Retained)...	1760–97%	1640–97%	1580–99%	1600–100%
Elongation (% Retained)	700–93%	640–78%	620–70%	800–86%

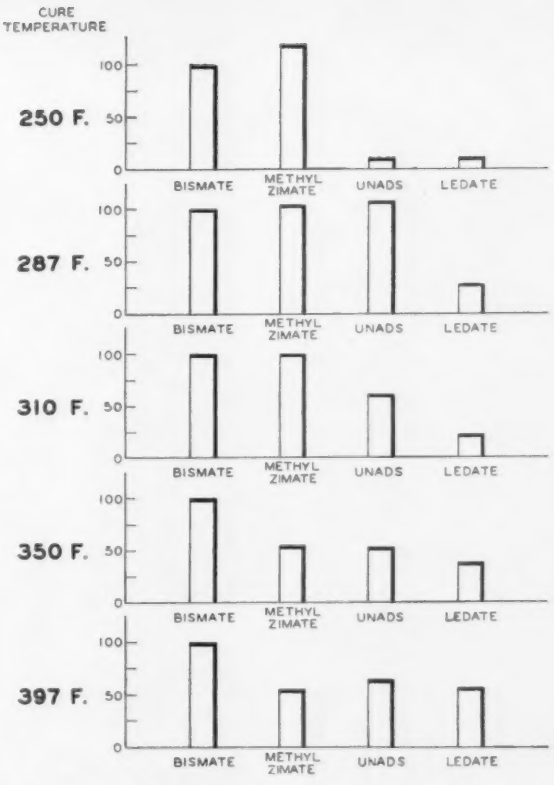


FIG. 4—Speed rating of accelerators. (Bismate taken as 100).

Possibly a clearer way to express the effect is to assign comparative speed ratings to the accelerators using 100 for the value for Bismate at each temperature. These ratings, shown in Figure 4, are proportional to the reciprocal of their respective "optimum" cure times at each temperature.

Figure 4 demonstrates that, while Zimate is a most effective accelerator at 250 to 310°F. (121 to 154°C.), and is thus more economical to use for curing at temperatures in this range, Bismate assumes a relatively faster rate at temperatures of 350°F. (177°C.) and over. At CV curing temperatures in this range, these data indicate that Bismate makes possible wire speeds 60 to 90 per cent greater than those obtainable with Zimate or Unads. This chart also verifies experience that Bismate compounds frequently show less tendency toward scorchiness than those based on Zimate.

An interesting hypothesis may be drawn from these data in regard to Ledate. As temperature is increased, this accelerator appears to gain steadily in its position with respect to the others. In fact, at 397°F. (203°C.) Ledate is fully as fast curing as Zimate. This may mean that at much higher CV curing temperatures than are now commonly used, say 430 to 450°F. (221 to 232°C.) Ledate may compare favorably with Bismate in curing speed. As a matter of fact, as will be substantiated later, it has been observed that some combinations of Bismate and Ledate exhibit synergism or interaction to give higher curing speeds at 397°F.

TABLE VIII—EFFECT OF ALTAX IN BISMATE JACKET

Jacket Base	228	228
Sulfur	2	2
Bismate	1	1
Altax	—	1
Mooney Scorch at 250°F. (121°C.)		
Time Scorch Begins (Mins.)	9	17
Time to 5-point Rise (Mins.)	7	6
Total Time (Mins.)	16	23
Rate of Rise Last Minute	1½	3½
Plasticity	30	27
Open Steam Cure at 287°F. (142°C.)		
Optimum Cure Time (Mins.)	15	15
Unaged		
Tensile (p.s.i.)	1940	2100
Elongation (%)	630	550
Stress (at 200% p.s.i.)	520	740
Aged 4-Day Oxygen Bomb at 70°C.		
Tensile (% Retained)	1760–91%	1780–90%
Elongation (% Retained)	560–89%	480–87%
Stress (at 200% p.s.i.)	660	880
Open Steam Cure at 397°F. (203°C.)		
Optimum Cure Time (Secs.)	10	10
Unaged		
Tensile (p.s.i.)	1820	1940
Elongation (%)	750	740
Stress (at 200% p.s.i.)	420	460
Aged 4-Day Oxygen Bomb at 70°C.		
Tensile (% Retained)	1760–97%	1800–93%
Elongation (% Retained)	700–93%	560–76%
Stress (at 200% p.s.i.)	600	760

(203°C.) than does either alone. This is a common classical phenomenon of combinations of rubber accelerators.

None of these observations is possible during the process of compound development if the compounder's vulcanization evaluation is limited to press cures at conventional temperatures in the neighborhood of 300 to 320°F. (149 to 160°C.). There has been much greater acceptance of Bismate and Ledate for high temperature CV stocks among those manufacturers who have access to laboratory flash vulcanizers and steam pressures of 150 psi or greater.

To complete the above experiment, data were obtained on accelerated agings of four days in the oxygen bomb at 70°C., using the 287°F. and 398°F. (142°C. and 203°C.) cure ranges, corresponding approximately to typical pan curing and high temperature CV curing conditions, respectively. These aging results are presented in Table VII. Based on per cent tensile and elongation retained after aging the accelerators show no significant differences in vulcanizates made at 287°F. (142°C.). However, the Bismate and Ledate stocks have less deterioration than the Zimate and Unads compounds when the curing is performed at 397°F. (203°C.).

While Bismate is not considered an especially scorchy accelerator as measured by Mooney scorch at 250°F. (121°C.), some users prefer greater safety than is obtained with this material alone. This may be accomplished by the addition of Altax in dosages up to that of

TABLE IX—EFFECT OF HEAT HISTORY ON BISMATE-ALTAX JACKET

Banbury Mix Temperature	Banbury Accelerator(s) → / Mill Accelerator(s) →	Altax & Bismate	Altax Bismate	Bismate Altax	Altax & Bismate
Control	Mooney Scorch				
	Time Scorch Begins (Mins.)	Control 19			
	Time to 5-Pt. Rise (Mins.)	7			
	Total Time (Mins.)	26			
	Rate of Rise, Last Min.	4			
	Plasticity	28			
	397°F. Steam Cure				
	Optimum Cure Time (Secs.)	15			
	Tensile-Elongation	1900–770			
265°F.	Mooney Scorch				
	Time Scorch Begins (Mins.)		18	18	16
	Time to 5-Pt. Rise (Mins.)		5	6	4
	Total Time (Mins.)		23	24	20
	Rate of Rise, Last Min.		3	2½	3½
	Plasticity		26	25	27
	397°F. Steam Cure				
	Optimum Cure Time (Secs.)		15	15	10
	Tensile-Elongation		1900–700	2000–720	1820–780
295°F.	Mooney Scorch				
	Time Scorch Begins (Mins.)		16	16	8
	Time to 5-Pt. Rise (Mins.)		5	6	3
	Total Time (Mins.)		21	22	11
	Rate of Rise, Last Min.		3½	2	4
	Plasticity		25½	25½	27½
	397°F. Steam Cure				
	Optimum Cure Time (Secs.)		15	15	10
	Tensile-Elongation		2020–680	2020–730	1900–700
330°F.	Mooney Scorch				
	Time Scorch Begins (Mins.)		13	15	3
	Time to 5-Pt. Rise (Mins.)		4	4	2
	Total Time (Mins.)		17	19	5
	Rate of Rise, Last Min.		3½	3	4
	Plasticity		28½	25	31½
	397°F. Steam Cure				
	Optimum Cure Time (Secs.)		10	15	10
	Tensile-Elongation		1960–680	2020–720	1900–750

the Bismate. Altax effectively delays incipient curing reaction at processing temperatures without reducing the vulcanization rate at CV temperatures. Table VIII compares the Bismate jacket compound described above with one containing an additional 1.0 part of Altax. Although curing speeds at both 287 and 397°F. (142 and 203°C.) have not been significantly impaired by the Altax, the scorch tendency has been appreciably reduced.

In spite of such typical laboratory data as these, occasional complaints of scorchiness of Bismate have been received from industry which, in turn, have led to intensive investigations. From these studies, it is known that Altax in the presence of the ultra-accelerators, if subjected to typical Banbury mixing temperatures of 280 to 320°F. (138 to 160°C.), can result in high reactivity and loss of delaying action. To demonstrate this, an experiment was designed in which the above jacket base stock was mixed with one part each of Bismate and Altax singly and collectively in the laboratory Banbury at temperatures of 265, 295 and 330°F. (130, 146 and 166°C., respectively), and compared to a control in which the accelerators were added to the base compound on a cool mill. The resulting stocks after the addition of sulfur on a cool mill were measured for Mooney scorch at 250°F. (121°C.), and for curing characteristics in open steam at 397°F. (203°C.).

The 265°F. (129°C.) Banbury temperature resulted from the use of cooling water for the full mixing cycle of 6 minutes, the accelerator(s) being added after two minutes [at temperatures averaging 215°F. (102°C.)] and mixed with the base for four minutes.

The 295°F. (146°C.) temperature series were the result of using no cooling water flowing through the Banbury during the mix. The base stock was masticated for three minutes, building up to average temperatures of 260 to 265°F. (127 to 130°C.). The accelerator(s) was added and mixed for four minutes for a total mixing time of seven minutes.

The 330°F. (166°C.) mixing condition was obtained by heating the mixer with steam at about 20 psi. The total mixing time was six minutes, the accelerator(s) being added after two minutes [and 305°F. (152°C.)] and mixed for four minutes.

The mill-mixed control required nine minutes and

TABLE X—GR-S INSULATION COMPOUND

GR-S 1503	75
GR-S 1018	25
Bondogen [1]	2
Stearic Acid	1
Zinc Oxide	50
Agerite White [2]	2
Agerite Resin D [3]	1
Hard Hydrocarbon	30
Ceresin Wax	2
Anti-Sun-Checking Wax	2
Atomite Whiting	50
Whitetex Clay	75
	315

(1) Mixture of an oil-soluble sulfonic acid of high molecular weight, with a hydrophobic alcohol of high boiling point and a paraffin oil. (2) Sym. di-beta-naphthyl-para-phenylene-diamine. (3) Polymerized trimethyl dihydroquinoline.

TABLE XI—EFFECT OF REDUCED SULFUR WITH BISMATE-ALTAX ACCELERATION IN GR-S INSULATION COMPOUND

	A-1	A-2	A-3	A-4	A-5	A-6
Base Compound	315.00	315.00	315.00	315.00	315.00	315.00
Litharge	5.00	—	—	—	—	—
Altax	2.50	1.00	1.00	1.00	1.00	1.00
Methyl Zimate	1.25	—	—	—	—	—
Bismate	—	3.00	3.00	3.00	3.00	3.00
Sulfur	1.25	1.25	1.00	0.75	0.50	0.25
Maximum Tensile Cure at 397°F. in Open Steam						
Cure Time (Seconds)	30	15	20	20	30	60
Unaged						
Tensile (p.s.i.)	1220	1300	1240	1160	960	580
Elongation (%)	730	720	710	800	950	1100
Stress (at 200% p.s.i.)	260	260	280	220	200	160
Aged 20 Hr. Air Bomb						
Tensile (% Retained)	1000–82%	960–74%	940–76%	1000–86%	920–96%	740–128%
Elongation (% Retained)	400–55%	370–51%	420–59%	520–65%	690–73%	780–71%
Stress (at 200%)	600	700	620	560	480	400
Aged 7 Day Oxygen Bomb 80°C.						
Tensile (% Retained)	1160–95%	1180–91%	1060–86%	1120–97%	940–98%	680–117%
Elongation (% Retained)	570–78%	550–76%	570–80%	650–81%	770–81%	920–84%
Stress (at 200%)	400	440	400	380	320	280
Mooney Scorch at 250°F.						
Time Scorch Begins (Mins.)	10	22	24	27	34	42
Time to 5-point Rise (Mins.)	4	6	8	9	11	17
Total Time (Mins.)	14	28	32	36	45	59
Rate of Rise, Last Min.	2½	1½	2	1½	1	½
Plasticity	30	32½	32½	31	30	31
Mechanical Water Absorption (Mgs./Sq. In.)	19.6	20.6	21.4	21.5	22.5	24.7

(Press Cures: 15 Mins. at 310°F.)

TABLE XII—BISMATE-LEDATE-ALTAX ACCELERATION AT 0.75 SULFUR LEVEL IN GR-S RH-RW INSULATION COMPOUND

	A-1	A-4	A-7	A-8	A-9
Base Compound	315.00	315.00	315.00	315.00	315.00
Litharge	5.00	—	—	—	—
Altax	2.50	1.00	1.00	1.00	1.00
Methyl Zimate	1.25	—	—	—	—
Bismate	—	3.00	2.00	1.00	—
Ledate	—	—	1.00	2.00	3.00
Sulfur	1.25	0.75	0.75	0.75	0.75
Maximum Tensile Cure at 397°F. in Open Steam					
Cure Time (Seconds)	30	20	15	30	60
Unaged					
Tensile (p.s.i.)	1220	1160	1000	1000	860
Elongation (%)	730	800	830	820	950
Stress (at 200% p.s.i.)	260	220	200	240	180
Aged 20 Hr. Air Bomb					
Tensile (% Retained)	1000–82%	1000–86%	960–96%	880–88%	840–98%
Elongation (% Retained)	400–55%	520–65%	480–58%	520–63%	600–63%
Stress (at 200%)	600	560	620	520	480
Aged 7 Day Oxygen Bomb 80°C.					
Tensile (% Retained)	1160–95%	1120–97%	1020–102%	1040–104%	900–104%
Elongation (% Retained)	570–78%	650–81%	640–77%	660–81%	750–79%
Stress (at 200%)	400	380	340	380	360
Mooney Scorch at 250°F.					
Time Scorch Begins (Mins.)	10	27	28	25	35
Time to 5-point Rise (Mins.)	4	9	8	10	19
Total Time (Mins.)	14	36	36	35	54
Rate of Rise, Last Min.	2½	1½	1	1½	½
Plasticity	30	31	31½	29	30½
Mechanical Water Absorption (Mgs./Sq. In.)	19.6	21.5	20.6	21.7	21.7

(Press Cures: 15 Mins. at 310°F.)

reached a maximum stock temperature of 165°F. (74°C.). For the stocks in which only one accelerator was added in the Banbury, the other accelerator was added on the cool mill under the same conditions as for the control stock. In all cases, the two parts of sulfur were added during the cool milling operation.

The scorch and curing data shown in Table IX demonstrate the strong activation of the accelerators from the high mixing temperatures, especially when they are both present in the compound during the original base mix. Either one of the accelerators in the mix by itself is activated to some extent by heat history, but it is recommended that Altax especially be withheld from the original base compound mix for addition later and at lower temperatures unless exceptionally good cooling keeps Banbury temperatures under 200°F. (93°C.).

Past experience with the other ultra-accelerators, particularly the Zimates, in combination with either Captax or Altax as the thiazole, has shown that the tendency to be activated by heat history in the absence of sulfur is a characteristic of these systems which should be taken into consideration for scorch free processing.

From the foregoing, it appears that, of the chemicals under consideration, Bismate is the ultra-accelerator having the best characteristic for high-temperature CV compounds. Inevitably, the thought occurs as to how well it will perform in a low-sulfur heat-aging resistant compound. Accordingly, a series of Bismate-Altax and Bismate-Ledate-Altax compounds were compared with a typical litharge-Altax-Zimate acceleration for RH-RW insulation. Table X shows the base compound, which was Banbury mixed. Mill additions of accelerators and sulfur were made according to Tables XI and XII. Compounds A-2 through A-6 are the same except for a decreasing range of sulfur content.

The data in the tables are based on maximum tensile values from a range of vulcanizates made at 397°F. (203°C.) in open steam. Maximum tensile was chosen because in an insulation stock this is frequently the value of greatest interest to the compounder, and also because in these stocks maximum values occurred at an early and realistic time of cure, nearly corresponding to times for maximum tensile product.

Of the straight Bismate-Altax compounds, A-3 and A-4 appear to have properties equivalent to the control with the added advantages of (1) a 50% greater curing speed and (2) a much slower scorch rate at 250°F. (121°C.). Sulfur levels of 0.5 part and lower lead to slower cures and poorer physicals, evidence of sulfur starvation. Also, the greater mechanical water absorption data indicate lower state of vulcanization.

In A-7, A-8, and A-9, the Bismate is gradually replaced with Ledate, holding sulfur at the 0.75 level. The addition of Ledate in small amount has a very interesting effect (see Compound A-7). While modulus, tensiles, and elongation indicate a slightly lower degree of vulcanization, the maximum tensile occurs in the 15-second cure, or in one half the time required for the control. Simultaneously, agings are comparable to those of the control stock and Mooney scorch is the same as for the straight Bismate stock, A-4, at the same 0.75 sulfur level.

The higher curing speed obtained by this low level

(Continued on page 948)

Effect of Varying the Vulcanization Temperature on the Properties of Black Reinforced Tread Compounds

By J. F. SVETLIK and H. E. RAILSBACK

Rubber Chemicals Division, Phillips Chemical Co., Akron, Ohio

Tread compounds reinforced with SAF, ISAF, HAF and FEF type carbon blacks have been vulcanized for variable periods of time at temperatures of 253, 280, 307 and 343°F. to establish how the properties would be affected by varying the curing conditions. Increasing the curing temperature lowered the modulus, increased hysteresis and decreased the resistance to deflection under load. The tensile strength was not affected significantly. Stocks cured at progressively higher temperatures contained diminishing amounts of free sulfur at equivalent states of cure and it is therefore postulated that stocks cured at high temperatures should possess better aging resistance. Tires cured at high temperatures might possess poorer abrasion resistance than those cured at low temperatures because the tread of the former will be deformed more under load and will generate more heat due to flexing.

The relative reinforcing potential of SAF, ISAF, HAF and FEF carbon blacks was not affected by varying the curing temperature.

Since physical properties are affected by varying the vulcanization temperature it is recommended that compound development work be conducted at a curing temperature approximating that at which the final article utilizing the compound will be cured.

TECHNOLOGICAL advances in recent years have increased production rates by permitting the use of shorter vulcanization periods at high temperatures. The use of shorter vulcanization cycles in manufacturing has reduced unit production costs with resulting savings to the consumer. While the economic aspects are all favorable the effect on physical properties of increasing the temperature while simultaneously reducing the curing cycle has received only meager attention.

Results reported in the literature on a hot GR-S stock vulcanized at 260, 280 and 300°F. indicated that even over this range of temperatures the properties can be affected *(1)*. With one acceleration system the properties obtained at essentially equal states of cure were similar irrespective of curing temperature, but with another acceleration system the properties were temperature dependent.

Recent years have seen the adoption of new types of rubbers, new carbon blacks and still higher curing temperatures. It appeared possible that the new reinforcing furnace carbon blacks might react differently to varying the curing temperature in cold rubber. Accordingly, a systematic evaluation of cold rubber tread type compounds reinforced with SAF, ISAF, HAF and FEF carbon blacks was undertaken to determine how the properties would vary when vulcanization was conducted at 253, 280, 307 and 343°F.

The temperature range was purposely chosen to extend from a more or less impractical low of 253°F. to a high of 343°F. which closely approximates the temperature used by some tire manufacturers for curing smaller tires. Intervals between successive temperatures were arbitrarily chosen at 27°F. (15°C.) or 36°F. (20°C.). At each curing temperature the vulcanization times were varied to obtain stocks ranging from undercured to overcured.

Note: This paper was presented before the 68th Meeting of the Division of Rubber Chemistry, American Chemical Society, Philadelphia, Penna., November 2-4, 1955.

TABLE I—COMPOUNDING RECIPES

Philprene 1500	100.0	100.0	100.0	100.0
SAF Black [a]	50.0	—	—	—
ISAF Black [b]	—	50.0	—	—
HAF Black [c]	—	—	50.0	—
FEF Black [d]	—	—	—	50.0
Zinc Oxide	3.0	3.0	3.0	3.0
Stearic Acid	1.0	1.0	1.0	1.0
Flexamine	1.0	1.0	1.0	1.0
Circosol 2XH	5.0	5.0	5.0	5.0
Paraflux 2016	5.0	5.0	5.0	5.0
Sulfur	1.75	1.75	1.75	1.75
Santocure	1.1	1.1	1.1	1.1

(a) Philblack E. (b) Philblack I. (c) Philblack O. (d) Philblack A.

TABLE II—VULCANIZATION PERIODS AND TEMPERATURE

(Time in Minutes)

253°F.	280°F.	307°F.	343°F.
30	20	10	5
60	30	20	10
90	45	30	15
150	75	45	20
300	150	75	30
450	300	150	45
—	—	—	75

Experimental

Recipes for the four tread type compounds utilized in this investigation are given in Table I. The only variable in the recipes is the type of carbon black. This was done so as not to introduce any factors other than black and temperature into the study. Vulcanization times at each temperature are shown in Table II. The range from undercure to overcure is covered at each temperature.

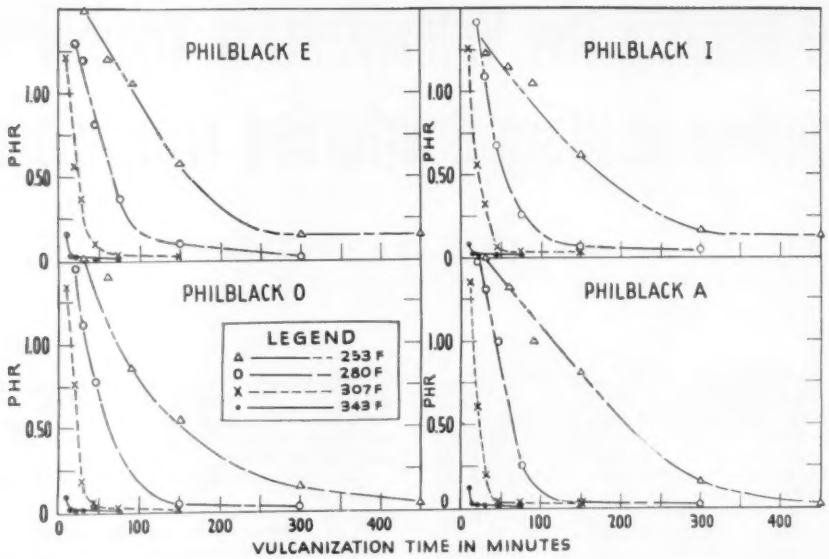


FIG. 1—Effect of curing temperature on free sulfur.

Arrangement of Data

Figures 1, 2, 3 and 4 depict changes of properties as a function of varying the time and temperature of curing with all four blacks. Since the trends are quite similar with all four blacks, the effect of curing temperature and time on four other properties is shown in Figure 5 for one black only.

The graphs show excellently the trends in properties, but comparisons at equal states of cure must also be made to establish the relationships in properties which exist when the curing times are adjusted to compensate for varying the curing temperature. The results in Tables III, IV and V were read from the graphs at curing times corresponding to 20, 15 and 10 percent compression set *(2, 3)* to allow comparisons at three states of cure. Experience has shown that tread compounds normally exhibit compression set values of approximately 15 to 20 percent; the properties at 10 percent compression set are in the overcured range.

Discussion of Results

Free sulfur as a function of vulcanization time and temperature is shown in Figure 1. The rate of sulfur reaction was extremely rapid at the high curing temperature and essentially no free sulfur existed even after only 10 minutes curing at 343°F. The data in Table III also show that the free sulfur content de-

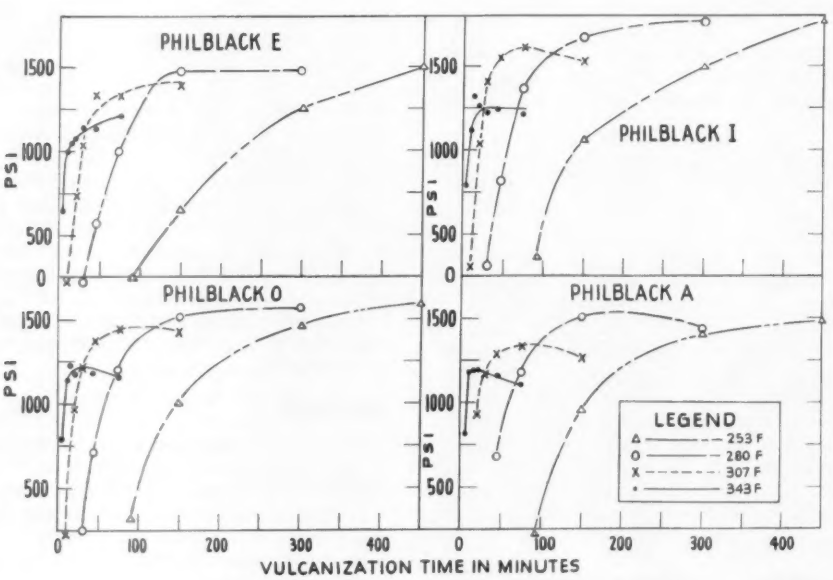


FIG. 2—Effect of curing temperature on 300% modulus.

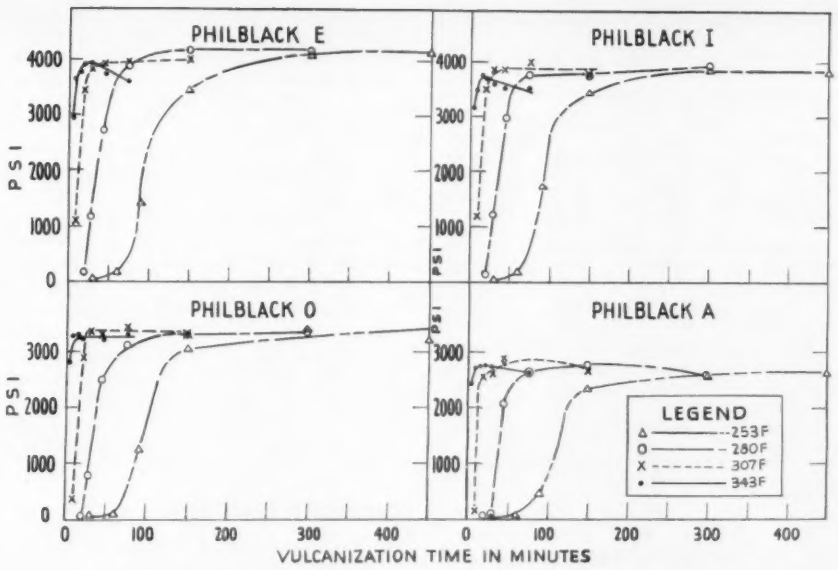


FIG. 3—Effect of curing temperature on tensile strength.

creased progressively with increasing curing temperature and the same trend was observed at all three states of cure. Since vulcanizates which contain low free sulfur normally age better than those containing more uncombined sulfur, the compounds vulcanized at the higher temperatures should possess the best aging resistance.

The stress-strain properties are plotted versus curing time at the four temperatures in Figures 2, 3 and 4. The corresponding data at the three states of cure are shown in Table IV. The graphs of Figure 2 show that as the curing temperature was raised the maximum 300 percent modulus was decreased. Comparisons at equal states of cure indicate that modulus of SAF and ISAF stocks was increased by raising the curing temperature from 253 to 280°F., but the HAF and FEF black compounds were not sensitive to this temperature variation. However, all of the compounds decreased in modulus as the temperature was raised above 280°F. (at all three states of cure) and the largest drop occurred between 307 and 343°F.

The data in Figure 3 and Table IV suggest that tensile strength is not too sensitive to curing temperature.

Raising the vulcanization temperature increased the elongation as shown in Figure 4. This would be expected since tensile was relatively flat and modulus decreased with increasing curing temperature. At equal states of cure the effect of temperature on elongation is somewhat

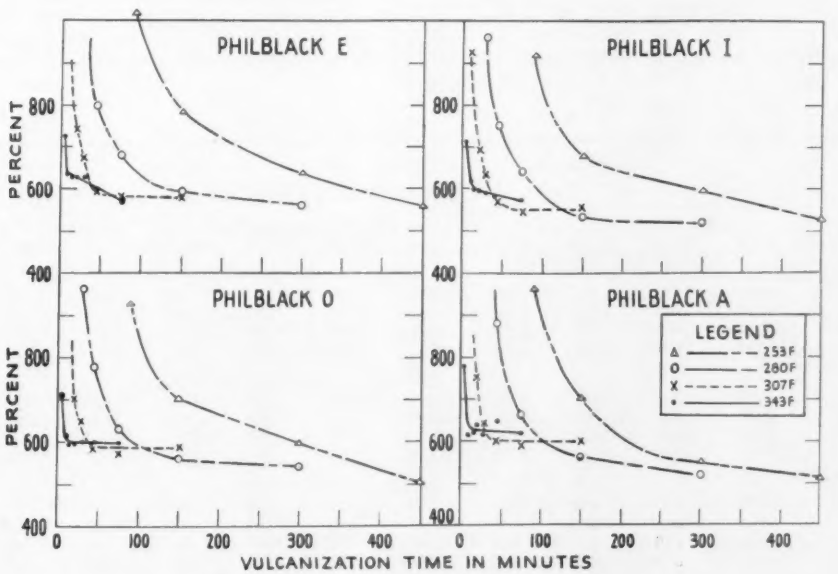


FIG. 4—Effect of curing temperature on elongation.

TABLE III—FREE SULFUR DATA

Curing Temperature °F.	Black SAF	ISAF	HAF	FEF
	20% Compression Set			
253	0.23	0.38	0.28	0.37
280	0.26	0.27	0.27	0.20
307	0.18	0.25	0.12	0.10
343	0.07	0.05	0.04	0.05
	15% Compression Set			
253	0.15	0.25	0.18	0.23
280	0.16	0.17	0.16	0.11
307	0.12	0.13	0.08	0.05
343	0.03	0.03	0.03	0.03
	10% Compression Set			
253	0.15	0.14	0.12	0.10
280	0.11	0.09	0.06	0.03
307	0.05	0.04	0.04	0.02
343	0.02	0.02	0.02	0.01

more indefinite but for cures corresponding to 10 and 15 percent compression set stocks vulcanized at 343°F. had higher elongations than those cured at 307°F.

In Figure 5 it is observed that raising the vulcanization temperature increased the heat generation and lowered the resilience. The detrimental effect of high curing temperature on heat generation is also clearly indicated in Table V, especially when comparisons are made at 15 or 10 percent compression set.

Figure 5 also shows that high temperature vulcanizates are dynamically softer. (Dynamic hardness is the force in pounds per square inch required to compress the hysteresis specimen 10 percent while flexing in the Goodrich Flexometer.) Comparisons at equal states of cure (Table V) also show that raising the vulcanization temperature above 280°F. lowers the dynamic hardness. These values appear to correlate quite well with modulus. Shore hardness is much less affected by curing temperature than is dynamic hardness.

Crack growth data determined in the DeMattia flexing machine are shown in Table VI. The values reported are the average for all cures beyond the inflection point in hardness, i.e., for the well cured stocks only. Varying the vulcanization temperature did not affect the flex life of the original specimens but after aging for 24 hours at 212°F. the HAF and FEF black reinforced stocks cured at higher temperatures were superior. One might predict that the stocks cured at higher temperatures would possess better crack growth resistance after aging because of their lower free sulfur content. The SAF and ISAF stocks exhibited good laboratory crack growth resistance after aging irrespective of the curing temperature.

The abrasion resistance of the compounds cured to approximately 15 percent compression set was determined on the laboratory angle abrader. The abrasion results in Table VII are expressed as percentages with the 280°F. cure for each black arbitrarily established at 100 percent. The effect of temperature on laboratory abrasion is not too well defined but there is an indication that the highest curing temperature gave poorer abrasion. It is known that modulus can affect the abrasion test and the poorer abrasion of compounds vulcanized at 343°F. may be attributable to their lower modulus.

Comparison of Carbon Blacks

The level of reinforcement of the four grades of carbon black was not affected by varying the curing temperature. The tensile strength, heat generation, resilience and Shore hardness results determined at all temperatures align the blacks in the same order of reinforcement. HAF and FEF black stocks exhibited the best crack growth resistance after aging when cured at high temperatures; the flex life of SAF and ISAF black stocks was not affected by curing temperature.

Significance of the Data

What are the advantages and disadvantages of using high curing temperatures, based on the data presented in the preceding discussion? It appears that low free sulfur in high temperature vulcanized stocks should be desirable because the stock should have better aging resistance. This appears to be partially substantiated by the aged crack growth data for at least two of the blacks. A second potential advantage of high temperature curing is that the dynamically softer stock may possess better skid resistance.

On the other hand, high temperature cured compounds possess poorer hysteresis and lower modulus and dynamic hardness. Due to their lower modulus and hardness the high temperature cured stocks will be deformed

TABLE IV—STRESS-STRAIN DATA

Curing Temperature	20% Compression Set SAF	ISAF	HAF	FEF	15% Compression Set SAF	ISAF	HAF	FEF	10% Compression Set SAF	ISAF	HAF	FEF
					300% Modulus (psi)							
253	1030	1250	1280	1290	1200	1370	1370	1360	1360	1540	1490	1420
280	1125	1360	1300	1250	1330	1510	1390	1330	1470	1600	1480	1430
307	1160	1430	1270	1230	1220	1510	1330	1260	1280	1575	1390	1310
343	1030	1150	1160	1180	1050	1180	1170	1180	1075	1220	1200	1190
					Tensile Strength (psi)							
253	3950	3700	3150	2520	4060	3800	3200	2560	4120	3850	3290	2610
280	3980	3720	3150	2650	4100	3760	3250	2690	4160	3780	3300	2740
307	3880	3800	3370	2700	3920	3850	3360	2730	3920	3880	3360	2820
343	3760	3700	3250	2750	3850	3700	3250	2750	3900	3700	3230	2750
					Elongation (Percent)							
253	695	635	650	575	650	615	625	555	600	585	580	540
280	660	645	615	645	620	600	590	610	590	560	570	580
307	650	610	620	610	600	580	600	605	585	560	585	600
343	635	610	610	630	630	600	600	630	630	595	600	630

TABLE V—HYSTERESIS AND HARDNESS DATA

Curing Temperature	20% Compression Set				15% Compression Set				10% Compression Set			
	SAF	ISAF	HAF	FEF	SAF	ISAF	HAF	FEF	SAF	ISAF	HAF	FEF
	Heat Generation (T °F.)											
253	80.0	75.5	72.5	62.0	73.0	70.5	67.0	59.0	71.5	66.0	61.5	57.5
280	78.0	73.5	64.0	63.0	74.0	70.0	61.5	60.0	72.0	68.0	62.0	58.5
307	83.0	74.0	69.5	66.0	78.0	72.0	67.0	64.0	74.0	70.5	65.5	62.0
343	81.0	75.0	71.5	66.5	79.5	74.5	71.0	66.0	79.5	74.0	71.0	66.0
	Resilience (Percent)											
253	51.7	55.0	59.7	65.3	53.5	56.2	61.2	65.5	55.3	58.3	62.7	66.6
280	52.3	56.0	61.4	64.8	53.2	58.7	62.4	65.6	54.2	58.2	63.3	67.2
307	50.8	55.6	60.0	63.5	51.7	55.7	60.4	64.3	52.8	56.2	61.0	64.5
343	52.8	55.9	59.5	62.5	53.0	56.2	60.2	62.7	53.8	56.5	60.3	63.0
	Dynamic Hardness (psi)											
253	111	112	109	127	127	120	119	140	143	136	135	158
280	120	127	122	126	142	132	134	133	164	144	143	143
307	113	117	108	113	118	120	111	122	123	124	113	127
343	105	111	104	110	109	111	104	108	118	110	103	108
	Shore Hardness											
253	57	54.5	54	54.5	58.5	56	54.5	55.5	59	59	55.5	56
280	57.5	56	52.5	51.5	59	57	54	53	60.5	58.5	55.5	53
307	59.5	57.5	53	52.5	60.5	58.0	53.5	53	62	58.5	54.5	53.5
343	58.5	56	53	51.5	59	56	53	51.5	59.5	56.5	53.5	52

to a greater extent under load and give a more severe "wiping" action on the road surface which should increase the rate of wear. The higher hysteresis can aggravate difficulties with tread and ply separation. Also, since rubber tends to abrade faster when hot, the higher hysteresis will deteriorate abrasion resistance.

Another major consideration is the rate of heat flow through the rubber article. The surface of the rubber immediately adjacent to the mold surface will start to vulcanize immediately when heat is applied while the rubber deeper within the article can only begin to vulcanize when the heat has penetrated to that point. In a tire tread the outer surface may be overcured before the inside of the tire is adequately cured. Therefore, at high curing temperatures a greater non-homogeneity of cure results than at low temperatures where a longer heating cycle is utilized because the time for the heat to flow from the outside to the inside of the tread is a smaller percentage of the total curing time.

If a tire is vulcanized in the neighborhood of 340°F., due to the factors noted above, the outer periphery of the tread may be cured to a point corresponding to 10 percent compression set or less while the inside of the tread is at much lower state of cure corresponding to more than 20 percent compression set. It also is immediately obvious that timing of the curing cycle is extremely critical at high temperatures to prevent possibilities of encountering undercure or overcure.

Most manufacturers do compound development work at temperatures in the range of 280°F. The results

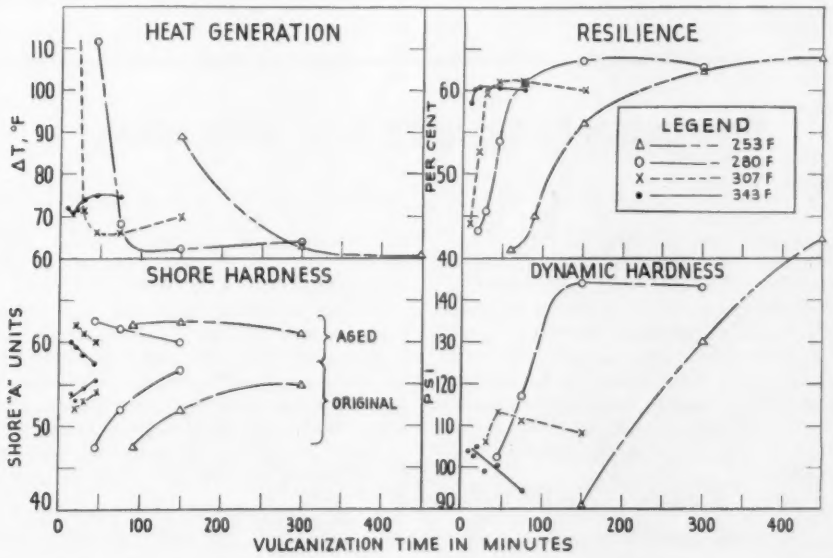


FIG. 5—Effect of curing temperature on hysteresis and hardness of Philblack O compound.

Table VI—Effect of Vulcanization Temperature on Crack Growth Resistance

Black	Vulcanization Temperature (°F.)	Flex Life × 10^{-3} Original	Flex Life × 10^{-3} Aged
SAF	253	11.4	5.7
	280	7.7	5.9
	307	10.6	8.3
	343	9.5	6.3
ISAF	253	11.4	6.8
	280	6.7	5.4
	307	10.6	6.7
	343	8.0	6.7
HAF	253	12.5	1.7
	280	8.8	3.0
	307	14.5	2.3
	343	12.9	5.9
FEF	253	13.5	0.9
	280	5.7	1.1
	307	10.5	1.0
	343	7.8	1.9

of this investigation suggest that compounds developed to produce the desired balance of properties when cured at 280°F. might possess widely different properties when utilized in a finished article which is cured at 330 to 340°F. In all probability not all compounds would react identically to increasing the curing temperature and, consequently, stocks which were developed at 280°F. to obtain a certain relationship of properties might not retain this relationship when cured at 330 to 340°F.

The question is then posed: Should compound development be performed at 280°F. or should it be done at a temperature approximating that at which it will be cured in the final application. From a laboratory standpoint it is convenient to cure at approximately 280°F. but at least some checking of the compounds at the appropriate elevated curing temperatures appears desirable and necessary .

Conclusions

Varying the curing temperature affected the physical properties of tread stocks studied in this investigation.

Table VII—Effect of Vulcanization Temperature on Relative Abrasion Resistance

(Relative Rating—Percent)

Temperature	SAF	ISAF	HAF	FEF
253	101	100	100	100
280	100	100	100	100
307	100	97	94	100
353	88	88	94	103

Elongation and aged flex life may be improved slightly by vulcanizing at higher temperature. Modulus and hardness are decreased and hysteresis is greater when vulcanization temperature is increased. It is postulated that tires cured at high temperatures will exhibit poorer abrasion resistance than tires cured at lower temperatures.

Varying the vulcanization temperature did not affect the relative reinforcement imparted by SAF, ISAF, HAF and FEF type carbon blacks.

Only one type of tread recipe was investigated in this study. It is possible that other compounds, employing different accelerators or sulfur ratios and even different rubbers, would not react in the same manner to varying the vulcanization temperature. Therefore, in developing new compounds it appears highly desirable to determine the physical properties on vulcanizates cured at a temperature approximating that at which the final article utilizing the stock will be cured.

LITERATURE REFERENCES

(1) Juve, A. E., and Garvey, B. S., "Effect of Time and Temperature of Cure on GR-S Tread Stocks," *Ind. Eng. Chem.*, Vol. 36, pp. 212-15 (1944).

(2) Sperberg, L. R., Bliss, L. A., Svetlik, J. F., and Tschirley, N. K., "Compression Set—A Relative Measure of State of Cure," paper presented before the Division of Rubber Chemistry, American Chemical Society, Chicago, 1946.

(3) Sperberg, L. R., "Relaxed Compression Set—A Definitive Property of Vulcanizates," *Rubber Age*, Vol. 76, pp. 401-12 (1954).

Nylon Emulsion Bonding Finding Use in Rubber Industry

PRODUCTION has just started by Belding Corticelli Industries, Inc., New York, N. Y. of a new nylon emulsion bonding, coating and finishing agent proved suitable for the textile, paper and rubber industries. Manufactured from Type 8 nylon resin, under license from E. I. du Pont de Nemours & Co., this new product is identified as "BCI Nylon Dispersion".

Belding Corticeli Industries, Inc., a subsidiary of Belding Heminway Co., Inc., New York, N. Y., first to use nylon in sewing thread, reports that its new nylon emulsion may be applied by dip coating, by roller or by spraying with either a heat sealable thermoplastic or thermoset finish as desired.

F. L. Johnson, president of Belding Corticelli Industries, has stated that field tests disclose that for nonwoven fabrics, this new nylon emulsion is a bonding and finishing agent that exhibits exceptional adhesive strength which increases the strength and flexibility of such fabrics as well as improving their laundering and dry cleaning characteristics. For woven or knitted fabrics, BCI Nylon Dispersion has added abrasion resistance and tensile strength as a newly developed and now marketed finish. It is also permeable to moisture vapor for "breathing."

In the paper industry, the new nylon emulsion has demonstrated such strong adhesive characteristics that it increases both the wet and dry strength of paper, proving particularly effective for new synthetic fiber papers. As a paper coating, it has increased abrasion resistance, and added vapor permeability characteristics necessary in some packaging materials. It also functions well as a petroleum barrier, the Belding Corticelli executive pointed out.

In the rubber industry, BCI Nylon Dispersion applied as a coating increases abrasion resistance and has petroleum barrier factors which show exceptional promise and wide range. As an adhesive, the new nylon emulsion will resist heat and curing damage.

Editorials . . .

Technical Manpower

THE continued shortage of technical manpower seems to be industry's number one problem at the moment. Although the shortage is greatest where engineers are concerned, there is definite evidence that shortages of other scientific personnel are becoming part and parcel of the problem. Have you tried to hire a competent chemist in recent months? Fortunately, the urging of some of our top executives has caused industry to pause and take a long look at the problem, rather than leaving it entirely to the academic world.

When industry is faced with a definite problem it seeks to find an equally definite answer. That the technical manpower shortage has been finally recognized as such a problem is evident in concrete actions which have been taken both by individual manufacturing organizations and their trade associations. For example, the American Society of Mechanical Engineers has announced the availability of a film, entitled "To Enrich Mankind," which is designed to explain to the general public the significance of the role of the mechanical engineer to the development of our country. The National Science Foundation has published a report on "Scientific Personnel Resources" which provides a well-organized assembly of useful data on the supply, utilization and training of engineers and scientists.

To continue, the Manufacturing Chemists' Association has issued a booklet, called "Frontiersman of the Future," which highlites for youngsters a vision of new horizons for pioneers in scientific research and shows them applications of chemistry in American living, and includes several indicators for determining science aptitude. (Incidentally, this booklet suggests that if you ask the old chemist what he would like most to be the answer is a young chemist). John R. Hoover, president of the B. F. Goodrich Chemical Co., and MCA board chairman, has recommended a personal "do-it-yourself" program to encourage more young people to enter into science or science-teaching careers. In this vein he has stated that "in our devotion to molecules we may forget men."

Industry, of course, has for many decades contributed to the encouragement of scientific careers through its scholarship programs, such as the eight $1,000 college scholarships recently announced by the Atlas Powder Co. which will go to students who will be seniors during the 1956-57 college year, majoring in chemistry or any branch of engineering. The large rubber companies, including all members of the Big Four, have regularly awarded similar scholarships and most of them have increased the number and amounts of these awards. These companies also encourage post graduate work for their employed scientists and frequently contribute toward the cost of such work.

That the rubber industry is aware of the over-all technical manpower shortage is well exemplified by the recent action of the Goodyear Tire & Rubber Co., as reported elsewhere in this issue. Goodyear has launched a four-point educational program designed to stimulate interest and encourage greater participation in scientific careers. The first of its type to be sponsored by a rubber company, the program provides for advanced technical training for full-time public and parochial high school mathematics and science teachers in Summit County (Ohio), increases the enrollment and facilities of the Goodyear Apprentice School and the company-sponsored Engineering Squadron training program, and provides for financial aid to further the education of Goodyear personnel who are engaged in engineering and technical work at company plants throughout the United States.

There are some bright and some peculiar aspects to the over-all problem. For instance, of some 5700 semi-final qualifiers for grants offered by the National Merit Scholarship Corporation, 56% of the boys and 16% of the girls, or an over-all rate of 45%, expressed a desire to become engineers or scientists. This might indicate that the endeavors of the manufacturers and their associations are beginning to have telling effect on the general public. That educators are beginning to lean on industry is typified by this story: When the chemistry teacher at the Winnsboro (N.C.) High School died, the school had difficulty in securing a replacement. So they turned to U. S. Rubber, which operates a textile mill and development laboratory in the town, and within three days the company furnished a qualified teacher.

Now that industry has put its shoulder to the wheel, the technical manpower shortage should begin to dwindle. It will not happen overnight, since it takes years to create a chemist or engineer. However, if the ambition is instilled in young people the results should be apparent in the not too distant future. It takes money to make money and this is the kind of expenditure that industry should undertake. If any argument is necessary, we suggest all rubber manufacturers read the preface to the book "The Mighty Force of Research." According to this preface, by Raymond Ewell of the National Science Foundation, society got back 100 to 200% a year of its dollars-and-cents investment in research over the last 25 years. In other words, society received $2500 to $5000 for every $100 spent on research and development. That's mighty impressive.

Highlights Sidelights *of the News . . .*

March, 1956

Both Houses of Congress have approved by overwhelming vote the sale of the Institute, West Va., synthetic rubber plant to Goodrich-Gulf Chemicals, Inc., for $11,000,000 plus $330,000 for spare parts and equipment on hand . . . The company has already announced modernization plans for Institute, including the conversion of two of three lines to the production of cold rubber . . . The remaining line will be in operation within 60 to 90 days producing hot rubber (page 905).

A complete report on the Sixth International Meeting of Technical Committee 45 of the International Organization for Standardization appears in this issue . . . The meeting was held from September 5 through 10 in Dusseldorf, Germany, with delegations from France, Germany, Italy, Netherlands, Switzerland, the United Kingdom and the United States in attendance (page 916).

The University of Akron has finally decided to give up its operation of the government's synthetic rubber laboratories and pilot plant as of June 30, 1956 . . . A special five-man committee of the University's board of directors determined that $1,000,000 a year in private contracts would have to be obtained by the University in order to "break even" in its operation of facilities . . . The laboratories and pilot plant will go on public sale on June 30 (page 905).

The tire manufacturing industry has thrown its full support behind the "pay-as-you-go" approach to financing construction of the inter-state highway system . . . A proposed measure under this system would increase the Federal excise tax on tires for highway use from 5 to 8c a pound and would add an entirely new tax of 3c a pound on rubber used for retreading purposes (page 915).

The National Safety Council reports that the rubber industry in 1954 had an accident frequency rate of 3.97, 15% less than in the preceding year . . . In 1954, the industry had an accident severity rate of .39, some 20% less than in the previous year and 47% less than in 1935-39 . . . The rubber industry as a whole ranked eighth in frequency and ninth in severity among 40 major industries in 1954 (page 921).

With the release of year-end statements by many of the major rubber companies comes another expression of the fact that 1955 was indeed a banner year for the rubber industry . . . Goodyear's profit and sales volume in 1955 was the highest in its history, while the same held true for U. S. Rubber . . . General Tire reports consolidated sales in 1955 were more than 36% ahead of 1954 (page 923).

NEWS REPORTS and Industry Activities

CONGRESS APPROVES SALE OF INSTITUTE PLANT; GOODRICH-GULF PLANS TO MODERNIZE FACILITY

ON February 8, Congress cleared the way for the reactivation of the Institute, West Va., synthetic rubber plant when it approved by overwhelming votes in both houses sale of the facility to Goodrich-Gulf Chemicals, Inc. of Cleveland, Ohio, for $11,000,000 plus $333,000 for spare parts and equipment on hand. Opponents of the sale, led by Senator J. William Fulbright (Dem., Ark.), argued that sale of the Institute plant to Goodrich-Gulf would give the four largest rubber companies control of two-thirds of the productive capacity of the synthetic rubber industry. Proponents, including Senator Homer E. Capehart (Rep., Ind.), said that disapproval of the sale would mean keeping the plant idle on a standby basis at a cost to the government of $230,000 a year. They said the price offered for the plant represented twice its present book value. The plant, originally built in 1942, cost the government $18,400,000.

In testimony before Senate and House committees which considered legislation authorizing the plant sale, William I. Burt, president of Goodrich-Gulf, stated that within 60 to 90 days after Congressional approval had been obtained, a third of the plant's 122,000 long ton annual capacity would be put into operation. He stated that it was the company's intention to reactivate one 40,000 long ton line within that time.

Since butadiene to support operation of the remaining lines will not become available until pending expansions are completed, 18 to 24 months from now, Mr. Burt said Goodrich-Gulf would immediately start converting the other lines for production of cold rubber. He stated that as soon as the first Institute line was put into production on hot rubber, equivalent capacity would be freed at Port Neches for the production of cold rubber, a conversion which, he told the Senate Banking and Currency Committee, will further ease the rubber supply.

Sales to Small Companies

Mr. Burt told Congress that "Goodrich-Gulf will make available for sale at fair market prices to small business in reasonably equal monthly quantities, the following tonnages per year: (a) 21,000 long tons, when only one line is in operation; (b) 51,000 long tons, when two lines are in operation; and (c) 81,000 long tons, when all three lines are in operation."

Both committees pressed for information as to how much GR-S had been made available since the synthetic rubber plants passed to private hands in May, 1955. Chairman Holman D. Pettibone of the Rubber Producing Facilities Disposal Commission testified that the buyers had committed themselves in their sales contracts to make available to small business 106,739 long tons of GR-S per year. He said he had canvassed producers just before the hearings and found on a pro-rata basis they had sold small business consumers 144,731 long tons, a total "clearly in excess of commitments."

Cites Modernization Plans

In his testimony before the Senate Banking and Currency Committee, Mr. Burt indicated that his company was prepared to spend $6,000,000 above the $11,000,000 sales price to modernize the Institute plant. He said that Institute's 122,000 long ton capacity could be duplicated at the company's Port Neches, Texas, plant for a similar amount, but that several months in construction time could be saved by buying and modernizing Institute.

Modernization plans for Institute, he said, include the conversion of two lines to cold rubber production and the building of a boiler plant to supply power. The third line, he indicated, would be producing hot rubber within 60 to 90 days, freeing the Port Neches plant for all cold rubber production. Mr. Burt declared that his company will keep its commitment to supply 67% of Institute's capacity to independent small business if the orders are forthcoming.

On February 20, following Congressional approval of the sale of the plant to Goodrich-Gulf, Mr. Burt announced that a modernization program at Institute would start immediately. The modernization program, extending over a four-year period, will include installation of refrigeration equipment for the production of cold rubber and the proper equipment to convert the present batch process to a continuous method of production. A major portion of this new production, Mr. Burt said, will be made available to small business.

To Discontinue Lab Operations

The University of Akron has decided to give up its operation of the government's synthetic rubber laboratories and pilot plant and the plant will go on sale June 30. This decision by the University's directors ended long speculation about the fate of the laboratories. The decision to discontinue operating the pilot plant effective June 30 was made on the recommendation of a special five-man committee of the University's board of directors headed by Harry P. Schrank, vice-chairman of the board and vice-president of the Seiberling Rubber Co.

The decision to discontinue laboratory operations was made "reluctantly and regretfully", the committee report said. Termination of the operation "will not result in any slackening of the University's interest in rubber research and in the training of rubber chemists", Dr. Norman P. Auburn, University president told the board. "On the contrary", he added, "plans are now under way to establish a Rubber Research Institute as an outgrowth of the Department of Rubber Research".

Annual Budget of $150,000

The department is headed by Dr. Maurice Morton, professor of polymer chemistry. It has an annual research budget of $150,000, supported by government and research grants. Its staff of twelve full-time research chemists, six full-time technical assistants and several part-time student assistants, conducts basic and theoretical research in rubber and plastics. Dr. Auburn also said the University hopes to expand its Chemistry Department so it can provide doctorate degrees in chemistry.

Discontinuance of the government laboratories will affect 129 employees directed by William K. Taft, manager. The Uni-

versity has been operating the laboratories and the pilot plant for the government since 1944. It received a management fee of $50,000 a year. In 1955, however, the government decided to divorce itself from the synthetic rubber business. A special commission of the National Science Foundation looked over the Akron facilities and decided that they should be sold. Deadline for the sale was set at June 30. The commission, however, offered the University a lease for one extra year.

Three Possible Choices

The University ended up with three possible choices: (1) It could buy the facilities by becoming a competitive bidder at the termination of the present arrangement; (2) It could lease the facilities for one year and then make a decision, or (3) It could abandon the operation.

Mr. Schrank's special committee found that the pilot plant would have to obtain $1,000,000 a year in private contracts to break even. The committee doubted that this volume of business could be obtained. The committee also decided that the University did not have enough money to buy the plant unless "some new source of revenue is found".

The committee decided it wasn't worth the "risk" to lease the plant for a year to make further studies. If the plant lost money during the period, the University wouldn't want it. If the plant made money, the bid price would go up.

The laboratory and pilot plant are now handling more than $200,000 in private contracts, mostly from oil companies. These contracts will have run their course by June 30.

Expanding New Bedford Plant

Goodyear Tire & Rubber Co., Akron, Ohio, is now in the process of expanding its plant at New Bedford, Mass., at a cost of over $1,000,000. A property adjacent to the plant is already being renovated and refitted. The New Bedford plant is already supplying all of Goodyear's tubeless tire flaps and the volume of demand for this product has grown considerably in the past year. Goodyear has also established at New Bedford a major warehousing depot. Other than tubeless tire flaps, the plant also produces bicycle tires, printer's blankets and camelback.

Recent DuPont Publications

The Elastomers Division of E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del., has released several new technical publications. Report BL-307 is on the subject of "Anti-Static Rug Backings," while Report BL-308 covers "Effect of Solvents on Neoprene, Polysulfide Rubber Nitrile Rubber Elastomers and Their Blends." Copies of these technical reports are available from the company.

A nineteen page booklet now available describes the complete series of "Triton" nonionic surface-active agents manufactured by the Rohm & Haas Co., Philadelphia, Penna.

Goodrich Boat Trailer Tire

A new tire designed specifically for boat trailers has been announced by the B. F. Goodrich Co., Akron, Ohio. Its sturdy four-ply construction gives it the strength needed for safer boat transport on the highway according to the company's Tire and Equipment Division. Like the house trailer tire used by leading manufacturers of mobile homes, the new trailer tire is built to meet the specific needs of free-rolling wheels and to withstand speeds normally used in transporting boats on highways. The tire is available in size 4.80/4.00-8 and fits either regular or wide-base rims.

3M Board Proposes Stock Split

Directors of the Minnesota Mining and Manufacturing Co., St. Paul, Minn., on February 20, voted to split the company's common stock 2-for-1, subject to stockholder approval at a meeting on May 8. The proposed split would be the fifth in the company's fifty-four year history. The last was a 4-for-1 split on January 8, 1951. The new split would raise to 64 the number of shares resulting from each share held prior to 1920.

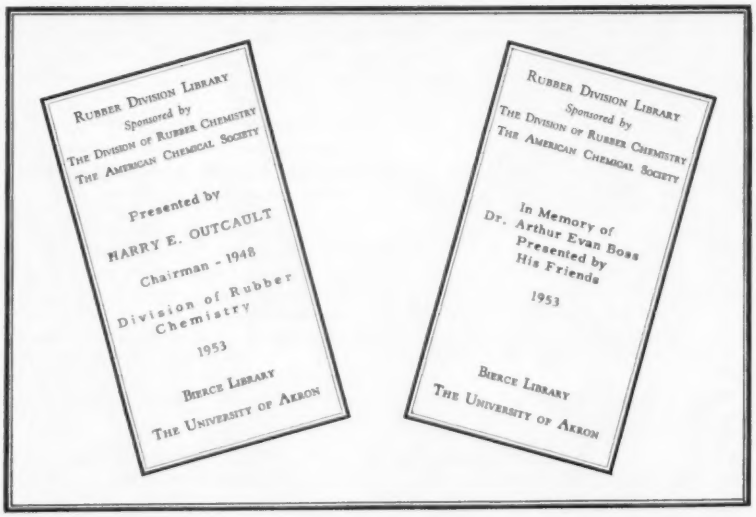
Arco Offers Compound Sampler

A unique "sampler" of a wide variety of "Arco" rubber and plastic lining compounds, was recently released by the engineering staff of the Automotive Rubber Co., Inc., Detroit, Mich. The "sampler" is a 3½ by 8½-inch folder carrying eleven actual specimens of rubber and elastomeric materials compounded, milled, and calendered in Arco mills. The specimens represent standard compounds used in the majority of corrosion and abrasion resistant lining work performed by Arco engineers and technicians on tanks, vessels, pipe, fittings, duct work, fans, etc.

Plans New Fiber Sales Office

The Textile Fibers Department of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., has announced plans to establish a completely staffed office in Akron, Ohio, to specialize in fiber sales to the rubber industry. Howard P. Brokaw, formerly assistant manager of industrial sales at Wilmington, has been named to the new post which will eventually bring him to Akron as regional manager.

DONATIONS TO RUBBER DIVISION LIBRARY NOW MARKED BY BOOKPLATES



Dr. B. S. Garvey, Jr. (Sharples Chemicals), vice-chairman of the Division of Rubber Chemistry of the American Chemical Society, who also functions as chairman of the Division's Library Committee, reports that bookplates, such as those shown above, are now being affixed to volumes either donated to or purchased by the Rubber Library which is maintained at the University of Akron in Akron, Ohio. The bookplates have been adopted as a means of recognizing special gifts to the Division Library.

A few years ago, when Harry Outcault, a past-chairman of the Rubber Division, retired from activities with the St. Joseph Lead Co., he turned over his personal bound volumes of *Chemical Abstracts* to the Rubber Library. Subsequently, the Library purchased a copy of the 25-Year Index to these abstracts. This purchase was made with funds supplied by Mrs. Arthur Evan Boss. When Dr. Boss died in 1949 there was quite a "flower fund" from a number of his friends and Mrs. Boss suggested that it be sent to the Rubber Library "for suitable use." At the time of his death, Dr. Boss was manager of pigment sales for the Columbia Chemical Division of the Pittsburgh Plate Glass Co.

The bookplates depicted above are being used to identify the Outcault and Boss contributions to the Rubber Library. It is the intention of the Library Committee to mark all future books, journals and other printed matter donated to the Library in a similar manner. In this way, proper recognition will be paid to those who so generously contribute to the future of the rubber industry.

SIX-MAN EXECUTIVE GROUP ANNOUNCED BY A. SCHULMAN

Establishment of a six-man executive committee to guide the destinies of A. Schulman, Inc., one of the world's largest rubber and plastics dealers, has been announced by Alex Schulman, president. The action, taken by the board of directors, was designed to insure Schulman customers that they will benefit from the combined knowledge and abilities of the company's top executives. The counseling group has a total of 179 years of experience in the rubber and plastics industries.

Named to the executive board in addition to Mr. Schulman, are James K. McElligot, vice-president; William C. Zekan, vice-president; Frank M. Francis, manager, Plastics Division; Milton Kushkin, vice-president and manager of the East St. Louis, Ill., office, and Paul Baudry, vice-president and manager of the New York office and Export-Import Division.

Founder of the company that bears his name, Alex Schulman is commemorating his 40th anniversary in the rubber business. After 12 years in sales and as branch manager and a director of another firm, he established his own company in 1928.

A. Schulman Inc. is now a major supplier of scrap rubber to the reclaiming industry, importer and dealer in crude rubber, and a processor and dealer in hard rubber dust, plastics and foam rubber.

Members of the new six-man executive committee formed by A. Schulman, Inc., are shown above. In the top row (left to right) are: Alex Schulman, James K. McElligot and William C. Zekan. In the bottom row, in the same order, are: Frank M. Francis, Milton Kushkin and Paul Baudry.

Background of Personnel

With over 40 years of experience in the scrap and crude rubber business, Mr. McElligot is one of the most widely-known men in this field. He has been with Schulman for the past 10 years since the liquidation of the Lowenthal Co.

Starting with Schulman 20 years ago as an office and sample boy, Mr. Zekan worked his way up to the vice-presidency and director at the age of 36. He was recently named to this post. During World War II, he served three years overseas with the Army in the European theater.

Mr. Francis began with Schulman 22 years ago last May. He has served with the firm in East St. Louis, Boston, Los Angeles and now Akron. Beginning as a stenographer in the Sales Department, he specialized in plastics and was on the War Production Board in Washington during the war.

Mr. Baudry had a colorful career in France before joining Schulman in 1945. He was an officer in the French Army in two wars, 1914-1918 and 1939-40. He was an interpreter in 1919 for the Armistice Commission. Mr. Baudry holds the Legion of Honor, the highest distinction offered by the French government. He operated his own rubber business in Paris for 20 years and for 10 years was presiding judge in the Paris Commercial Court. At one time, Mr. Baudry also was president of the Waste Rubber Dealers Association in Paris.

The other member of the committee, Milton Kushkin, vice-president, attended the University of Akron for four years before entering the rubber business with Shulman in 1929. He started with the company by calling on dealers to buy scrap tires. He then was with the Chicago office for about a year and in New York for a year. Twenty-one years ago, Mr. Kushkin went to St. Louis to open that office and has been there ever since. From 1952 to 1954, he was president of the Scrap Rubber and Plastic Institute of the National Association of Waste Material Dealers.

To Build Butadiene Plant

Purchase of a 1,000-acre industrial site by the Firestone Tire & Rubber Co. for the manufacture of petrochemicals in Orange, Texas, has been announced recently by Harvey S. Firetone, Jr., chairman of the company. First unit of this center will be a 40,000-ton-capacity butadiene manufacturing plant which will provide Firestone with a substantial portion of the butadiene requirements of its synthetic rubber plants at Lake Charles, La., and Akron, Ohio. Construction of the new plant is scheduled to be started in May. Firestone Co. at present is the largest producer of rubber in the world. Total annual rubber producing capacity of its two synthetic plants and its extensive plantations in Liberia, West Africa, approximates 240,000 tons, the company states. The new butadiene plant will obtain its principal raw material, butane, directly from a network of pipelines throughout Texas. The new butadiene plant will be located in the industrial area southwest of the city and will employ more than 300 people. Mr. Firestone also announced that the company is expanding its Pottstown, Penna., chemical manufacturing facilities.

Seiberling Clarifies Position

J. P. Seiberling, president of the Seiberling Rubber Co., on February 21, informed Edward Lamb of Toledo, Ohio, that there is "no justification" to his demand for control of the company, but said that Mr. Lamb was entitled to board representation in proportion to his stockholdings. Mr. Seiberling said Mr. Lamb had met with the board of directors on February 20 and demanded 5 board seats out of 9 or 4 seats plus an executive officer and Executive Committee membership. Either proposal would give "domination of the affairs and policies of the company," Mr. Seiberling said. On the basis of Mr. Lamb's own statement of stock ownership, Mr. Seiberling declared, "he would not be entitled to even 4 board members."

In a letter to Mr. Lamb, Mr. Seiberling stated that the board had always been willing to recognize his position as a "substantial share holder," but would not agree to his demand for company control. "In view of the greatly improved earnings record of the company, and the favorable outlook for the future, we can see no justification for recommending that shareholders give you control or domination of the company's policies, even though you have proposed retaining the present officers. We fully recognize your right to exercise cumulative voting privileges, and realize you may nominate and elect representatives to the board of directors to the extent of your shareholdings," the Seiberling executive stated.

Take a long time for this copy of RUBBER AGE to reach your desk? Use the coupon on page 983.

A.C.S. RUBBER DIVISION NAMES WINNERS OF BEST PAPER AWARD

Dr. J. P. McKenzie, technical director of the Copolymer Rubber & Chemical Corp., Baton Rouge, La., and J. D. Sutherland, a chemical engineer in the company's Research and Development Division, have been named winners of the "Best Paper Award" of the Division of Rubber Chemistry, American Chemical Society. They were cited for presenting the best scientific paper at the division's 68th meeting held on November 2-4, 1955, in Philadelphia, Penna. The papers were judged by a committee of reviewers on the basis of technical importance of the subject matter, the quality of oral presentation, and the quality of the visual presentation.

The winning paper, entitled "A Glass Polymerization Vessel for Small Scale Laboratory Studies," described an apparatus made from a standard industrial electric light globe. The apparatus, which includes an agitator, temperature control and arrangement for sampling, is designed for the production of experimental polymers—materials such as rubber and plastics which are synthesized by linking molecules together into long chains to form "giant" molecules.

Mr. Sutherland, who presented the paper in Philadelphia, is a native of Baton Rouge. He received the B.S. degree from Louisiana State University in 1950. In his five years with Copolymer, Mr. Sutherland has served in the mechanical engineering, process engineering and research departments. He is currently assigned to the pilot plant, where his duties include experimental polymer preparation, special research projects and equipment design.

Dr. McKenzie received the Ph. D. degree in organic chemistry from Northwestern University in 1934. He was employed by the Marbon Corp., Gary, Ind., until 1943, when he joined Copolymer as a research chemist. He was appointed technical director in 1946. He was active in the development work on cold rubber, and represented Copolymer on various research and development committees of the government's wartime synthetic rubber program.

Coated Nylon Fabrics Report

Results of Navy research into the shelf life of lightweight neoprene coated nylon fabrics have just been released to industry by the Office of Technical Services, U. S. Department of Commerce. Nineteen coated fabrics, including four types of neoprene and one Buna-N, were stored for periods of one to over four years. Neoprene coated fabrics were found to have withstood storage very well, with little or no change noted in waterproofness, flexibility, breaking strength, weathering resistance or ability to withstand laundering and dry cleaning. Small losses were observed in tear strength. All types of neoprene tested had equally good results; however, the one sample of Buna-N tested showed moderate tear strength losses. This report, PB 111-728 *Shelf Life of Neoprene Coated Nylon Fabrics,* Bureau of Supplies and Accounts, April, 1955, is available from OTS, U. S. Department of Commerce, Washington 25, D. C., price 75 cents. It contains 18 pages.

1955 Capital Outlay

According to the U. S. Department of Commerce, the rubber products industry is calculated to have spent about $149,000,000 on capital equipment in 1955, as compared with the $131,000,000 in the previous year and $161,000,000 in 1953. The 1955 figure includes an estimate of $44,000,000 for the fourth quarter, representing scheduled outlays by manufacturers for that period. Capital outlays for the first quarter of 1956 are scheduled at $39,000,000, well above the $30,000,000 actually spent in the first quarter of 1955. With some reduction in the production of rubber goods probable for 1956 as a result of lower automobile output, it is possible that capital outlays in the second half of the year will fall somewhat below the $39,000,000 reported for the third quarter of 1955 and the $44,000,000 which had been scheduled in the last quarter of that year. Therefore, expenditures for the year 1956 may not exceed the 1955 figure, especially since capacities have been raised substantially in recent years, and for most rubber products appear reasonably ample to meet probable demand in the next few years, the Commerce Department believes.

Low Boy Trailer Tires

What is said to be a revolutionary small-size tire has been developed by Dayton Rubber Co., Dayton, Ohio, to give mobile home owners more comfort, more floor space and more choice of interior design. Called the "Low Boy", the trailer tire has only a ten-inch inside diameter, five inches less than standard types. The smaller size eliminates bulky wheel housings and lowers the trailer's center of gravity, providing a smoother, safer ride. With unobstructed floor space, trailer manufacturers now can provide more versatile interior furnishing plans. The radical reduction in tire size called for the solution of many difficult engineering and production problems. A rubber industry axiom is "the smaller the tire, the more difficult the manufacture," Dayton Rubber notes.

Asco Products Corp. Formed

Asphaltic Specialties Co., Nixon, N. J., has announced the establishment of a marketing and sales organization to be known as the Asco Products Corp. The new company has been created in the interests of greater efficiency and better customer service. As of February 1, sales of all Asphaltic specialties products were taken over by the new organization. Asphaltic Specialties will confine itself to manufacturing operations and research activities incident to the development of new and better products based on asphalt, coal tar, synthetic resins, natural and synthetic rubber and other chemical raw materials.

BRAZIL REPORTS IMPRESSIVE GROWTH OF RUBBER INDUSTRY

According to reports from Brazil, the rubber industry in that country has made impressive strides since 1948. In that year, there were only 120 plants devoted to the manufacture of rubber articles, employing 10,533 workers and returning to the government in taxes about Cr$129,000,000. By 1953, the number of factories had more than doubled, reaching, in fact, 291, and employing 25,000 workers, returning to the government in taxes Cr$500,000,000. Its total investment had skyrocketed to Cr$4,911,000,000 from the 1948 total of Cr$1,177,000,000.

Between these two years, the number of plants increased by 143 per cent, the number of employees by 137 per cent, the taxes collected by 289 per cent and the amount of investment by 317 per cent.

Data for 1954 are still incomplete, but according to the Executive Committee for the Defense of Rubber, the number of plants should have risen beyond 300, with 28,000 employees, with the government tax-take about Cr$720,000,000.

By 1960, in order to satisfy the demands for tires and tubes, for medical and surgical products and for those of domestic use, the investment in this industry will have to surpass Cr$10,000,000,000. Even so, it is expected that at that time Brazil will once more have to resort to importing rubber products.

At present heavy industrial production accounts for 88%, chiefly in the form of tires and tubes. There are six plants in Brazil devoted to this product, of which four are in the State of Sao Paulo, one in the Federal District and the other in the State of Rio. The remaining 12% is of light industry manufacture and consists largely of industrial, medico-surgical and domestic articles. These are turned out by some three hundred factories.

Tire Industry Safety Program

Representatives of five tire manufacturing companies met recently in Washington, D. C., for a briefing session prior to the start of a unique tire industry contribution to traffic safety. At the conclusion of the three-day training session, those attending "donned new hats" for the next 90 days and will be serving as field personnel of the Inter-Industry Highway Safety Committee. M. R. Darlington, managing director of the Inter-Industry Committee, called the loan of men by the tire companies "an outstanding example of the unselfish and positive interest of the tire industry in greater safety on our streets and highways. Their generous help will aid immeasurably in assuring the success of the 1956 Vehicle Safety-Check program." Attending the meeting were: Edward D. Burks (Firestone); Forest R. Eyer (General Tire); Carl E. Albaugh and Ernest F. Bognar (Goodrich); Thomas S. Woods, III (Goodyear), and Norbert J. Griffin (U. S. Rubber).

Like to make a suggestion to the industry? Write a letter to the editor! (See page 824).

DUPONT ISOCYANATES FACILITY BEGINS PRODUCTION SCHEDULE

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., announced on February 16 that its new isocyanates plant, geared to manufacture 25,000,000 pounds a year, is now in production. The new plant is at the company's Chambers Works at Deepwater Point, N. J., and now employs more than 100 people.

Organic isocyanates, of the types being made at the new plant, are chemicals which, in combination with other compounds, form rubberlike or plastic-like materials with potentially wide use in such fields as building, transportation, upholstery, and insulation. By reacting polyisocyanates with alkyd resins, alcohol, amines, or even water, chemists have developed many radically new materials, ranging from rigid and flexible foams to a new experimental synthetic rubber for automobile tires.

The foamed materials combine unusually high strength, toughness, and resistance to shock and vibration with light weight. They provide essentially the same resilience as foam rubber, at only half the weight. Their sound absorption ability is high, thermal conductivity low, and many types will not support combustion, DuPont states.

Foam-in-Place Feature

Probably the most remarkable feature of both the rigid and flexible foams is that they can be foamed in place at room temperature in complicated cavities. The liquid ingredients are simply mixed together and poured into the cavity or mold —the resulting chemical reaction expands the material to about 20 times its original volume, and the foam thus produced conforms to every curve and corner of the cavity. At the same time, foamed-in-place material bonds firmly to whatever it is foamed around or against—whether metal, wood, masonry, glass, or fabric. Foaming takes place rapidly; the material is usually complete in less than 15 minutes.

End-products already on the market, made chiefly of resilient isocyanate foams, include the dashboard and sun visor crash-pads on some new model automobiles, pillows and cushions, rug underlays, household sponges, insulating liners, shoulder pads for clothing and a variety of other items. DuPont does not make these end products. The company supplies only the basic isocyanates from which other manufacturers make the foams.

Potential uses for the rigid and resilient foams are numerous. Among those now being field-tested are prefabricated building panels in which the facing materials are both held together and insulated by the foamed-in-place core; lightweight cushioning for planes, trains, and buses; foamed-in-place insulation between the inner and outer shells of home freezers and refrigerators; and foamed reinforcement for aircraft structures.

Conceivably, cushioning may some day be made by simply lining a mold with fabric, then forming and upholstering the unit in a single, simple pouring operation. The fabric would adhere tightly to the isocyanate-foam cushion without separate use of adhesives, tacks, or sewing. Springs might also be eliminated.

Urethane rubber is still another polyisocyanate product which shows promise of ultimate importance. DuPont is currently experimenting with an elastomer of this type, called "Adiprene" urethane rubber. It displays high strength, toughness, good resistance to tearing, heat, and oxidation, and is classified as oil-resistant. Its outstanding characteristic, however, is expected to be abrasion resistance.

The versatility of isocyanate foams is demonstrated by the variety of end-products already on the market, as shown above. These include pillows and cushions, rug underlays, sponges, mats, absorbent soap dishes, etc. Of particular interest is the use of the new material for dashboard and sun visor crash pads on some new model automobiles, as seen in the background.

Elastomer Process Licensees

Seven major European companies have been licensed to use the Elastomer process in the production of vinyl foam according to an announcement by the Girdler Co., Louisville, Ky., the exclusive licensor of the new process in all foreign countries except Canada. The Elastomer process was developed by the Elastomer Chemical Corp. of Newark, N. J., and uses an inert gas, rather than a chemical blowing agent, to make vinyl foam. The seven European licensees are: Les Etablissements Marechal of Paris, France; Le Laboureur, Roubaix, Wattrelos (Nord), France; Svenska Gummifabriks Aktiebolaget, Gislaved, Sweden; Dunlop Rubber Co., Ltd., London, England; Dunlopillo G.m.b.H., Hanau Am Main, Germany; British Geon, Ltd., London, England; Elson & Robbins, Ltd., Long Eaton, Nottingham, England. All major rubber companies in the U. S. and a large number of vinyl processors, have acquired licenses to produce vinyl foam by the Elastomer process. Many of these companies employ Girdler "Votator" apparatus for foaming plastisols, and Girdler "Thermex" high frequency apparatus for electronically fusing the product.

Order your copy of the 1955-56 RUBBER RED BOOK? Do it today!

FORT WAYNE MEETING FEATURES OZONE RESISTANCE SYMPOSIUM

The Fort Wayne Rubber and Plastics Group held its third meeting of the 1955-56 season on February 8th at the Hotel Van Orman in Fort Wayne, Ind. Approximately 150 members and guests were in attendance. The meeting featured a report by the Nominating Committee as to proposed officers for the 1956-57 season. Those named included: *Chairman,* M. J. O'Connor (O'Connor & Co.); *Vice-Chairman,* John G. Dixon, Jr. (Anaconda Cable) and George Kelsheimer (U. S. Rubber); *Secretary-Treasurer,* Phil Magner, Jr. (General Tire) and Conway Knapp (U. S. Rubber).

The meeting also featured a panel discussion on "Ozone Resistance of Rubber Compounds." Dr. H. A. Winkelmann (Dryden Rubber) served as moderator. Panelists and the papers they presented follow:

"Weather Aging of Automotive Rubber Products" by W. J. Simpson (Chrysler).

"Outdoor and Indoor Weather Testing" by Armond J. Kearfott and Harold Treckler (General Motors).

"Ozone Test Methods" by F. W. Wilcox (Witco).

Other panel members included: Dr. Littman (Packard Electric Division); J. F. McWhorter (Ohio Rubber), and Harold Crooke (Ford). Following the presentation of papers by the panel members, a question and answer period was held.

Rowe Methods Buys Bumpers, Inc.

Bumpers, Inc., manufacturers of reversible dock and truck bumpers, has been purchased by Rowe Methods, Inc., Cleveland, Ohio, manufacturers of hydraulic dock leveling devices. Bumpers will henceforth operate as a wholly-owned subsidiary of Rowe. According to C. W. Choromanski, who becomes secretary of the new subsidiary in addition to his administrative duties with Rowe, "those distributors who presently handle the Bumpers line will be retained. In addition, new distribution will be established in those areas not now covered." The Bumpers line includes four standard sizes of dock bumpers for truck dock application, truck bumpers which may be mounted anywhere on such vehicles, and marine dock bumpers for wharves and rubber knees for tow-boats. The new location for Bumpers, Inc., is 2534 Detroit Avenue, Cleveland 13, Ohio.

Bulletins on Polypol S-70

Polychemicals Division of the West Virginia Pulp and Paper Co., Charleston A. S. C., has announced the publication of four new technical bulletins relating to the use of "Polypol S-70", a coprecipitate of lignin and a butadiene-styrene copolymer. Technical Bulletin No. 201 lists "Typical Polypol S-70 Compounds". Technical Bulletin No. 202 concerns itself with "Polypol S-70 Compounds of Lower Loading." Technical Bulletin No. 203 covers "Polypol S-70 in Semi-Hard Rubber Compounds," while Technical Bulletin No. 204 is on the subject of "Polypol S-70 Curing Systems."

GORDON RESEARCH CONFERENCES TO FEATURE ELASTOMER PAPERS

A session on elastomers will feature the Gordon Research Conferences of the American Association for the Advancement of Science for 1956. The Elastomers Conference will be held from July 30 through August 3 at Colby Junior College, New London, N.H. Other sessions of the Gordon Conferences have been scheduled from June 11 through August 31 at different educational institutions in New Hampshire.

The Gordon Conferences were established to stimulate research in universities, research foundations and industrial laboratories. This purpose is achieved by an informal type of meeting consisting of scheduled lectures and free discussion groups. Sufficient time is available to stimulate informal discussions among members of a conference. Meetings are held in the morning and evening, Monday through Friday, with the exception of Friday evening. The afternoons are available for recreation, reading or participation in discussion groups as the individual desires.

The first meeting of each Conference is held Monday morning at 9:00 A.M., Eastern Daylight Saving Time. The morning sessions, through Friday, are scheduled from 9:00 A.M. to 12:00 noon. The second session of each day is held in the evening from 7:30 P.M. to 10:00 P.M., Monday through Thursday. Accomodations are available for a limited number of women to attend each Conference, also for wives who wish to accompany their husbands.

Requests for attendance at the Conference, or for any additional information should be addressed to W. George Parks, Director, Department of Chemistry, University of Rhode Island, Kingston, R.I. From June 11 to August 31, 1956, mail should be addressed to Colby Junior College, New London, N. H.

Dr. B. S. Biggs (Bell Telephone Laboratories) is serving as chairman of the Elastomers Conference, and Dr. E. E. Gruber (General Tire) is vice-chairman. The papers to be presented at the Conference and their authors follow:

July 30, 1956

"Adhesive Bonding of Metals" by S. N. Muchnick (Franklin Institute).

"Fundamentals of Rubber Adhesion" by D. M. Alstadt (Lord Mfg.).

Crystallinity and Orientation in Organosiloxane Polymers—X-Ray Diffraction Studies" by S. M. Ohlberg and L. E. Alexander (Mellon Institute).

"Crystallinity and Orientation in Organosiloxane Polymers—Physical Measurements" by E. L. Warrick (Mellon Institute).

July 31, 1956

"Synthesis by Anionic Polymerization of New Elastomers and Unsaturated Crystalline Polymers" by G. Natta (Instituti di Chimica, Milan, Italy).

"Biosynthesis of Rubber" by W. S. McNatt (California Institute of Technology).

This session will also feature a general discussion of "Synthesis and Properties of C's Polyisoprene and Related Polymers."

August 1, 1956

"Formation and Properties of Networks Involving Addition Polymers Having Reactive End Groups" by R. M. Pierson (Goodyear).

"Interaction Between Rubbers and Fillers" by H. Westlinning (Degussa, Germany).

"The Significance of Swelling Equilibria in Carbon Black Reinforced Elastomers" by G. Kraus (Phillips Petroleum).

August 2, 1956

"Reinforcement by Fine Particle Silica" by J. W. Sellers, D. Inman and M. P. Wagner (Columbia-Southern).

"Approach for Studing the Molecular Structure of Elastomers" by I. Auerbach, W. C. Kuryla and S. D. Gehman (Goodyear).

"Recent Developments in Theories of Elastic Behavior and Mechanical Failure of Rubber" by L. Mullins (B.R.P.R.A.).

August 3, 1956

"Dynamic Properties of Strained Elastomers" by K. W. Scott (Goodyear).

"Stress Relaxation of Natural Rubber Vulcanizates" by J. P. Berry (Akron University).

Goodyear Research Appointments

Dr. H. J. Osterhof, director of research for the Goodyear Tire & Rubber Co., Akron, Ohio, has announced a number of appointments to the company's Research Division. Joseph J. Wadlinger, formerly of the Engineering Training Squadron, has joined the Process Engineering Section of the Research Division. Samuel H. Ashworth has joined the Physics and Electronics Section of the division and Harold D. Orloff has joined the Diene Synthetic Rubbers Section.

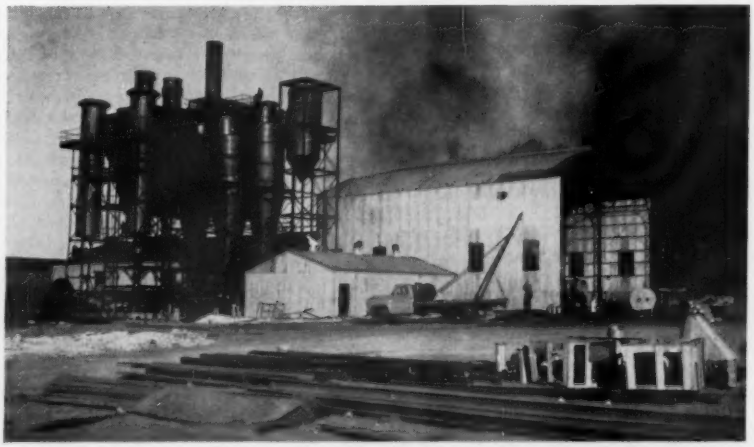
Appointments at Hewitt-Robins

Six changes have been announced in the accounting organization of Hewitt-Robins, Inc., Stamford, Conn. The changes announced by Austin Franklin, controller, follow: Fred R. Abel, Passaic, N. J., plant controller, appointed assistant controller in charge of accounting for the conveyors and engineers divisions. Walter G. Neeb, assistant plant controller at Passaic, appointed plant controller. E. Pennington Meyer, plant controller at the foam rubber plant in Buffalo, N. Y., appointed assistant controller in charge of all accounting matters for the foam products division plants at Buffalo and Staten Island, N. Y. Randolph L. Hickey, assistant plant controller of the foam plant, Buffalo, appointed plant controller of that plant. Edwin G. Shuttleworth, plant controller at the industrial rubber plant in Buffalo, appointed assistant controller in charge of all accounting matters for the rubber division and expense accounting for the company's industrial products sales organization. Ralph S. Crosman, now division controller for the engineers division, will be responsible for additional duties dealing with the commercial, financial and legal aspects of the division's contracts.

Stauffer Appoints Emison

Sam Emison has been appointed director of industrial chemical sales of Stauffer Chemical Co., New York, N. Y., replacing R. U. Haslanger, who has resigned to accept an executive position with a newly formed chemical company. Mr. Emison joined Consolidated Chemical Industries Inc. (recently merged into Stauffer) in operations and engineering in 1925. A chemical engineer, he had been sales manager of Consolidated for the past 15 years. He will headquarter in New York City.

NEW WITCO-CONTINENTAL CARBON BLACK PLANT NEARING COMPLETION



An important step in easing the shortage of SRF carbon black will be taken when Witco-Continental Chemical Co. puts its new Eunice, New Mexico, plant on stream in May. First in New Mexico, the gas furnace-type plant will produce 25,000,000 pounds of SRF (semi-reinforcing, furnace) black annually, enough to reinforce 8,000,000 tire carcasses. The precipitator and cyclones are shown at the left of the picture. The small building is the control house and the large structure shown in the photograph above is the company's new wet process building.

WASHINGTON GROUP HEARS JUVE DISCUSS TIRE WEAR RESEARCH

The January meeting of the Washington Rubber Group held at the PEPCO Auditorium in Washington, D. C., heard an interesting address by Arthur E. Juve, director of technical services for the B. F. Goodrich Co., on "Physical Properties and Tire Wear." Mr. Juve is also chairman of the Division of Rubber Chemistry of the American Chemical Society.

Mr. Juve pointed out that while there has been much speculation on the mechanism of abrasive wear of a tire tread, fortunately little of this has been published due to a striking lack of confirming data and thus the speculations were either inclusive or unpromising. He referred to three publications that have discussed the mechanism of tread abrasion, and two papers which discuss a related subject, namely, the properties desirable in a tread composition and which influence the rate of abrasive wear.

As to the mechanism of tread abrasion, revealing photographs were shown that explain how abrasive wear was determined. One involved placing a vacuum sweeper behind the tire near the road surface which picked up the tread particles that were torn loose against the road. The other involved running the tire that had been compounded with a plasticizer containing radioactive phosphorus over a road surface against which later was placed a photographic film. Radioactive specks of rubber left on the road produced an identifiable effect on the developed negative.

The amount and direction of motion of portions of the tire tread in relation to the road surface was observed by running a tire—with and without acceleration—over a glass plate coated with a silver mirror and dusted with particles of carborundum. The resulting scratches could easily be photographed. Under normal driving conditions, the scratches were about 1/10 inch long. This represents a tire slippage of about 128 miles for 10,000 miles of travel. It is also of interest that the edges of the tread move in relation to the road about 30% more than the center.

Conclusion on Tread Wear

Mr. Juve's conclusion was that the only thing causing tread wear was the extent of relative movement between the tread surface and the road surface. He agreed with the point of view that abrasion involves the removal of discrete particles of rubber from the surface of the tread by the process of local stretching of elements of the tread surface to the breaking point of the rubber. He pointed out that while the average temperature of the surface of a rubber tread during operation may be in the range of 140-170°F., the temperature of discrete particles slipping on the roadway may be much higher. Also, he pointed out that the rate of elongation of these discrete particles of rubber is not the usual 10% per second as determined on a stress-strain apparatus, but is more nearly 200,000% per second.

With respect to tread stock properties which are important in influencing tread wear, Mr. Juve concluded that the energy required to stretch and break elements of the tread stock is of the greatest significance. The energy which the stock can absorb without breaking is related to the energy input and to the hardness. He concluded that for a particular level of modulus, for example 300%, the best stock is one which has the lowest hardness. Further, the hardness level per se is of less importance than the ratio of modulus (at a high extension) to hardness. By compounding treads of either natural or synthetic rubber with different types of black he obtained good confirmation of this conclusion.

It was possible to show that for two stocks with equal modulus the type of carbon black which produced a lower hardness gave better tread wear and that when the stocks were compounded to produce equal hardness, the carbon black which produced the higher modulus gave better wear. A satisfactory equation which will permit one to calculate the performance of the tread stock by simple measurements of its physical properties has not yet been devised.

Coming Events in the Rubber Industry

Mar. 16. Boston Rubber Group, Spring Meeting, Hotel Somerset, Boston, Mass.

Mar. 16. Chicago Rubber Group, Furniture Club, Chicago, Ill.

Mar. 23. New York Rubber Group, Henry Hudson Hotel, New York, N. Y.

Apr. 6. Akron Rubber Group, Mayflower Hotel, Akron, Ohio.

Apr. 12. Fort Wayne Rubber & Plastics Group, Hotel Van Orman, Fort Wayne, Ind.

Apr. 13. Detroit Rubber & Plastics Group, Spring Meeting, Detroit-Leland Hotel, Detroit, Mich.

Apr. 13. Philadelphia Rubber Group, Poor Richard Club, Phila., Penna.

Apr. 17. Elastomer and Plastics Group.

Apr. 27. Chicago Rubber Group, Furniture Club, Chicago, Ill.

May 11. Buffalo & Ontario Rubber Groups, International Meeting, Hotel Sheraton-Brock, Niagara Falls, Ontario, Canada.

May 15. Elastomer and Plastics Group.

May 16-18. Division of Rubber Chemistry, A.C.S., Hotel Cleveland, Cleveland, Ohio.

May 25. Connecticut Rubber Group.

June 7. New York Rubber Group, Summer Outing, Doerr's Grove, Millburn, N. J.

June 8. Fort Wayne Rubber & Plastics Group, Summer Outing.

June 13. Buffalo Rubber Group, Summer Outing.

June 15. Boston Rubber Group, Annual Summer Outing, Andover Country Club, Andover, Mass.

June 17-22. American Society for Testing Materials, 59th Annual Meeting, Chalfonte-Haddon Hall, Atlantic City, N. J.

June 21. Akron Rubber Group, Outing, Firestone Country Club, Akron, Ohio.

June 22. Detroit Rubber & Plastics Group, Summer Outing, Western Country Club, Detroit, Mich.

Aug. 2. New York Rubber Group, Golf Tournament, Innis Arden Golf Club, Old Greenwich, Conn.

Aug. 17. Philadelphia Rubber Group, Manufacturers' Golf & Country Club, Oreland, Penna.

Sept. 8. Connecticut Rubber Group, Summer Outing.

Sept. 19-21. Division of Rubber Chemistry, A.C.S., Chalfonte-Haddon Hall, Atlantic City, N. J.

Sept. 27. Fort Wayne Rubber & Plastics Group, Hotel Van Orman, Fort Wayne, Ind.

Oct. 2. Buffalo Rubber Group, Fall Meeting.

Oct. 5. Boston Rubber Group, Fall Meeting, Hotel Somerset, Boston, Mass.

Oct. 5. Detroit Rubber & Plastics Group, Fall Meeting, Detroit-Leland Hotel, Detroit, Mich.

Oct. 5. New York Rubber Group, Henry Hudson Hotel, New York.

Oct. 26. Akron Rubber Group, Mayflower Hotel, Akron, Ohio.

Oct. 26. Philadelphia Rubber Group, Poor Richard Club, Phila., Penna.

Nov. 16. Connecticut Rubber Group.

Dec. 5. Buffalo Rubber Group, Xmas Party.

Dec. 6. Fort Wayne Rubber & Plastics Group, Hotel Van Orman, Fort Wayne, Ind.

Dec. 7. Detroit Rubber & Plastics Group, Xmas Party, Sheraton-Cadillac Hotel, Detroit, Mich.

Dec. 14. Boston Rubber Group, Xmas Party, Hotel Somerset, Boston, Mass.

Dec. 14. New York Rubber Group, Xmas Party, Henry Hudson Hotel, New York.

Another copy of RUBBER AGE needed in your office? Use the coupon on page 983.

SWAN RUBBER COMPANY ISSUES INTERESTING PROGRESS REPORT

Swan Rubber Co. of Bucyrus, Ohio, said to be the world's largest manufacturer of garden hose, reflects that being the big fish in a small pond offers few problems as long as the pond expands with the fish. As the major industry in Bucyrus, a city of 10,400 population, Swan Rubber has noted that its expansion program has run a parallel course to the increasing labor supply, improved transportation facilities and burgeoning power source.

The company, which now makes enough hose yearly to circle the earth twice at the Equator, was incorporated on September 28, 1927, as the Swan River Tire & Rubber Co. Two years later, the corporate name was changed to the Swan Rubber Co. Although garden hose (42% of total production) is the principal product, the company also manufactures mechanical hose and molded tires.

Significant in Swan's growth is the yearly figure of net profits before taxes. In 1928 and 1929, the first two years in business, Swan operated at a loss. Thereafter, they operated at a profit and have continuously paid dividends since 1936. In 1947 and each year since the profit figure before taxes has been over $1,000,000. In 1951 the profits before taxes were more than $2,500,000. Sales continued to climb and for 1955 showed an increase of $2,856,188 or 21% over 1954.

Financial Background Reviewed

Swan has paid its own way in Bucyrus. The only new money put into the company since the original backing by Isaac Nussbaum (late father of company president Mort G. Nussbaum) and ten Bucyrus businessmen was a $675,000 issue of preferred stock in 1946, since converted to common stock. This was used for a postwar expansion program.

From its inception, Swan found that its location had all the necessary ingredients for success. As the plant grew, employment increased and greater demands were put on the power source, which fortunately, for Bucyrus and Swan, was growing too. The supply of available labor was growing too, with Bucyrus' population jumping 10% since 1940.

Says company President Nussbaum, "If the town's labor supply had not increased and the area's resources had not been suited for a growing economy, we may have had to move or cut down our growth. Neither was a pleasant prospect."

Electric power for Bucyrus is supplied by the Ohio Power Co., one of the largest electric utilities in the state. An operating company of the American Gas and Electric Co., Ohio Power supplies Bucyrus with three 66,000 volt transmission lines from two separate sources. Natural fuel gas, also vital to industrial operations such as Swan's is available to industrial users at 55c per 1,000 cubic feet when monthly consumption is in excess of 20,000 cubic feet.

Despite the fact that Swan operates extensive research laboratories and has developed a number of product innovations, it holds no patents on any of its products and has registered only two trade marks. President Nussbaum feels that the cost of patent defense is more than a patent's benefits since six out of ten fail to stand up in court anyway.

Although plastic and rubber garden hose is the largest single item, Swan does a substantial business in washing machine hoses. Name brands such as "Whirlpool", "Bendix," and "Maytag" are among its customers.

Swan's second product is mechanical hose. This includes automobile heater hose, power steering hose and power brake hose. Swan's heater hose is original equipment on cars produced by the "Big Three" of the industry, exclusively on some cars and partially on others.

"We're called the 'Woolworth' of the hose industry," says Mr. Nussbaum, "mainly because of our column production, but we like to think it's partly because of our ability to cut corners and still come out with a marketable product. Most of our ability to do that stems from our research, stable labor, ample power supply and our good location."

Swan's latest development is a rubber tired plastic wheel for lawn mowers. Fabricated of styrene plastic, the wheel has withstood pressures up to 1,100 pounds. Although the wheel does not require oiling, it was compounded to resist deterioration if enthusiastic do-it-yourselfers decide to oil it anyway.

Plastic Reclamation Plant

Mr. Nussbaum reports, "This is one of the most recent examples of our growth and planning. We started making some of the garden hose from plastic. Then we built a plastic reclamation plant two years ago. Now with plastic and rubber capabilities, we can produce a very complete line."

Swan's expansion included a new warehouse of 43,000 square feet, built in the summer of 1954. A branch plant at Carey, Ohio, 28 miles northwest of Bucyrus, makes semi-pneumatic tires, extruded tiring, plastic wheels and grips. Since 1940, Swan has increased its labor force five times over and now employs 1,100 workers with a yearly payroll of $4,422,610. This payroll would make up over 40% of the resources of Bucyrus' largest bank.

Also significant in Swan's growth is the development and maintenance of sound labor relations. Indications of labor quality and stability are evident in that a heavy majority of the workers own their own homes and over half have more than five years' service with Swan. The plant operates from Sunday midnight to Saturday midnight. The sixth day earnings make weekly wages $15 to $20 higher than neighboring industries. Even so, many of Swan's workers supplement their incomes by farming.

Swan, a national distributor, credits its central location for a part of its economy of operation. "The pay scale, power rate and other production costs are all tailored to the industrial strength of the area, enabling us to operate at a reasonable cost," reports Fred C. Ward, vice-president and treasurer. Mr. Ward, a registered C.P.A. and a member of the board of directors with over 15 years in the firm, is typical of the four top men in management who together have 75 years in the 26 year old company.

Company's Future Plans

According to Mr. Nussbaum, Swan's plan for the future are geared closely with the development of the Bucyrus area. "As any manufacturer," he says, "we must depend on the area's resources to the same degree to which we contribute to them. The potential of North-Central Ohio as a manufacturing site is developing under the wise management of Chambers of Commerce, service groups, power companies and transportation services. We've never regretted locating here. Our interest now is in nourishing our industrial growth to match the area's. If we can do it in the future as we have done it in the past, then we'll be a bigger fish in a bigger pond."

Whitewall V-Belts

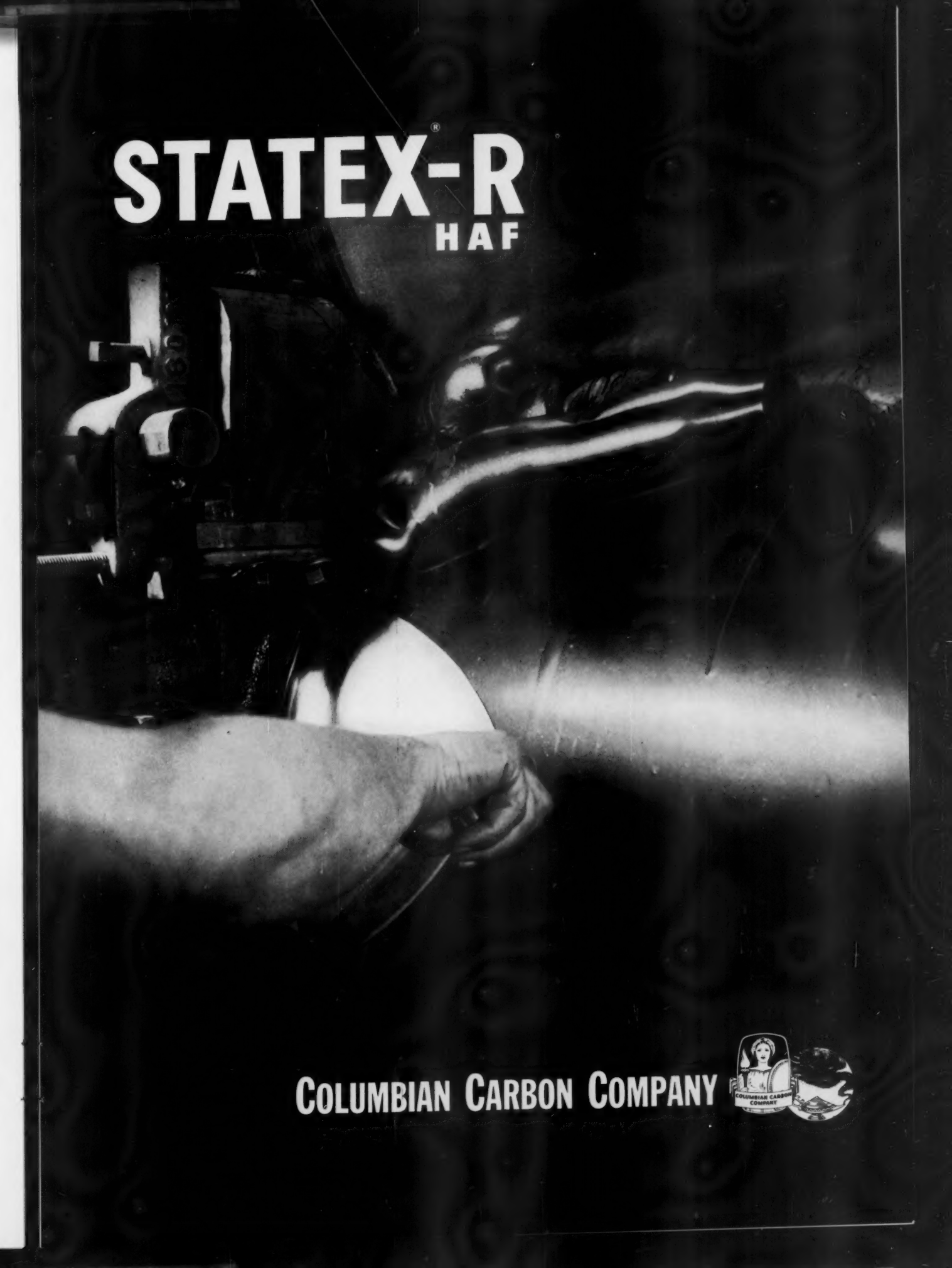
Dayton Rubber Co., Dayton, Ohio, was recently presented with a problem by a manufacturer who required a rubber V-belt that would not smudge envelopes while conveying them through a folding machine. To solve the problem, Dayton Rubber engineers put regular white sidewall tire stock on top of the belts to keep black rubber away from the envelopes.

Selects New Plant Site

W. R. Grace & Co., New York, N. Y., has selected a site near Baton Rouge, La., for its new polyethylene project, construction of which has already begun. The project involves construction of a million dollar semi-works plant for polyethylene and other polymers, expected to go into operation this summer, together with the erection of a large plant for the commercial production of polyethylene. The latter is expected to be on stream by mid-1957. The Grace plant will produce a new temperature-resistant type of polyethylene under processes licensed from the Phillips Petroleum Co. It is stated that capacity of the Baton Rouge plant will be 50,000,000 pounds a year. At peak production, approximately 300 persons will be employed. The installation will be located on a 150-acre site six miles north of Baton Rouge and near an Esso Standard Oil Co. refinery which will supply ethylene, the basic raw material.

Reduces Isocyanates Prices

The Elastomers Division of E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del., has announced a price reduction of 15c per pound on "Hylene" organic isocyanates. The price cut was made possible, the company said, by increased volume of sales due to an expanding market. The new prices are: Hylene T, $1.15; Hylene TM, $1.05; and Hylene TM-65, $1.05. These prices per pound apply to standard drums of 500 pounds net.


STATEX®-R
HAF
COLUMBIAN CARBON COMPANY
COLUMBIAN CARBON COMPANY

STATEX®-125 ISAF
(Intermediate Super Abrasion Furnace)

STATEX-R HAF
(High Abrasion Furnace)

STANDARD MICRONEX® MPC
(Medium Processing Channel)

MICRONEX W-6 EPC
(Easy Processing Channel)

STATEX-B FF
(Fine Furnace)

STATEX-M FEF
(Fast Extruding Furnace)

STATEX-93 HMF
(High Modulus Furnace)

FURNEX® SRF
(Semi-Reinforcing Furnace)

COLUMBIAN CARBON COMPANY
380 Madison Avenue, New York 17, N. Y.

AIEE RUBBER SUBCOMMITTEE PLANS TWO-DAY AKRON MEETING

The Subcommittee on Rubber and Plastics Industries of the General Industry Applications Committee, Industry Division, American Institute of Electrical Engineers, has announced its tentative program for the "Conference on Electrical Engineering Problems in the Rubber and Plastics Industries" which will be held on April 9 and 10 at the Mayflower Hotel in Akron, Ohio.

Not only have a number of interesting papers been planned for the meeting, but open and prepared discussion periods have also been provided for. The keynote address on April 9 will be delivered by W. E. Chope, president of the Industrial Nucleonics Corp. The banquet in the evening of April 9 will feature an address by W. S. Wolfe, factory manager, domestic operations, Goodyear Tire & Rubber Co.

The following papers have been scheduled for April 9:

"Cypak—A New Concept for Industrial Control" by P. G. Hanna (Westinghouse).

"Designing Safety Into Electrical Controls" by Gregory DiCaudo (Goodyear).

"Controlling Fault Currents in Low Voltage Systems" by William Deans (I-T-E Circuit Breaker).

"Training of Personnel for Maintenance of Electrical and Electronic Equipment" (panel discussion). Moderator: H. Warren (Roos, Wallace Clark).

The sessions on April 10 will begin with a symposium on "Problems of Equipment Operating in Contaminated Atmospheres." E. L. Smith (Firestone) will serve as committee chairman for the symposium, which will include the following papers:

"Silicone Rubber Motor Insulations" by J. L. Kuehlthau (Allis Chalmers).

"Irradiated Polyethylene Motor Insulation" by Henry E. Mazanek (General Electric).

"Epoxy Resins for Motor Insulation" by Dr. Henry L. Lee (Epoxylite).

Other papers scheduled for presentation on April 10th include the following:

"Pros and Cons of Standardization" by W. P. Curtis (Ford).

"Requirements of Regulators for Selected Applications" by A. G. Seifried (Goodrich).

"New Developments in Dielectric Heating" by W. H. Hickok (Girdler).

Hamlin Sold to McNeil Machine

Hamlin Metal Products Co. of Akron, Ohio, has been sold to the McNeil Machine & Engineering Co., Akron, for an undisclosed sum. Producers of stampings for automotive, aircraft and appliance industries, Hamlin also turns out aluminum shovels. Normally, the firm has a production force of 200. Charles F. Safreed, president of McNeil Machine, states that no changes are contemplated in the organization of Hamlin. M. D. Walklet, president of Hamlin under its former owners, will continue as general manager.

A new educational and sales promotion tool in the form of an eight minute film is now available from the Society of the Plastics Industry, Inc., New York, N. Y.

Integrates Carbon Black Labs

Witco Chemical Co., New York, N. Y., has reorganized its carbon black operations to put all laboratory facilities in one department, Max A. Minnig, president of Witco, has announced. The new system—another step in a company streamlining program instituted by Mr. Minnig—establishes a direct line from the company's carbon black chemists to the customer. John H. Gifford, who has been in charge of the new Witco rubber chemicals laboratory in Akron, is chief of the new department. He is responsible for all carbon black technical service, as well as for production control for the Continental Carbon Co., a Witco associate. His new title is technical director, Carbon Black and Rubber Chemicals Division.

Harry M. Brubaker, vice-president in charge of this division, continues as supervisor of over-all sales and service. Rubber technical service will be handled by Leslie Carver and Daniel Chovan and their groups. Under Mr. Gifford's direction, Walter Tanner and his staff will continue in the ink, paint and plastics industries. Dale Strasser of the Akron laboratory will be on call as consultant on packaging and shipping problems. Mr. Gifford will be in charge of the Continental control laboratories, as well as plant chemists. Mr. Gifford is a 1936 graduate in chemistry from Sheffield Scientific School at Yale University. Before joining Witco in 1954, he spent 18 years with B. F. Goodrich Co. His last post there was assistant to the chief tire compounder, in charge of the tire and tube development program. He is a member of the Rubber Division of the American Chemical Society.

Metaline Bulletins Available

Spadone-Alfa Corp., South Norwalk, Conn., has announced the availability of a new publication on "Metaline Oilless Bronze Bearings and Plates." Consisting of a folder containing five separate bulletins, the publication covers such subjects as expansion plates, proper alloy selection, Metaline as a "premolded lubricant," and general descriptive material. Copies of the publication are available from the company.

"So much for the Dipping Department—anything else ya wanna see?"

TIRE MANUFACTURERS SUPPORTING "PAY-AS-YOU-GO" HIGHWAY PLAN

The tire manufacturing industry has thrown its full support behind the "pay-as-you-go" approach to financing construction of the inter-state highway system. Ross R Ormsby, president of the Rubber Manufacturers' Association, Inc., announced this position following a meeting in Washington, D. C., of representatives of the Tire Division of the RMA. He said the industry had studied the Boggs bill (HR 9075) and regarded its provisions for financing the inter-state system, as applied to rubber products, as equitable, spreading costs of the construction program fairly among highway users. This measure would increase the Federal excise tax on tires for highway use from 5c to 8c a pound and would add an entirely new tax of 3c a pound on rubber used for retreading purposes.

Mr. Ormsby noted that the increase proposed on tires is proportionately higher than increases suggested in the excise taxes on other automotive products. He stated, however, that the industry would support the Boggs bill because it "believes wholeheartedly in the pressing need for an expanded system of federal inter-state and defense highways."

Irve Eisbrouch, vice-president in charge of tire sales, the Dayton Rubber Co., will represent the industry when it appears before the Ways and Means Committee in the course of the forthcoming hearings to document its support.

The following companies were present and subscribed to this statement: Carlisle Corp., the Dayton Rubber Co., Dunlop Tire & Rubber Co., Firestone Tire & Rubber Co., General Tire & Rubber Co., B. F. Goodrich Co., Goodyear Tire & Rubber Co., Kelly-Springfield Tire Co., Seiberling Rubber Co., and U. S. Rubber Co.

Firestone Promotes Wilson

Ross E. Wilson has been elected vice-president of the Firestone Plantations Co. in Liberia by the board of directors of the company. Mr. Wilson continues as general manager of Firestone's rubber plantations in the West African republic, a position he has held since 1943. A graduate of the University of Akron, Mr. Wilson was a member of the first group of Firestone personnel assigned to develop rubber plantations in the West African republic in 1926. Two years later, he was appointed chief engineer for the plantations. With the exception of five years in the United States, Mr. Wilson's career has been spent in Liberia. Mr. Wilson is a director of the Firestone Plantations Co. and is president and a director of the United States Trading Co.

Expanding Butadiene Plant

Petroleum Chemicals, Inc., has announced plans for a $4,350,000 expansion in the butadiene plant it operates at Lake Charles, La. Petroleum Chemicals is owned jointly by the Continental Oil Co. and the Cities Service Co. Capacity of the plant will be increased from 63,000 tons to 79,000 tons of butadiene annually. Work on the project is scheduled for completion by next fall.

ISO/TC 45 REPORTS ON ACTIVITIES AT SIXTH INTERNATIONAL MEETING

A report on the Sixth International Meeting of Technical Committee 45 of the International Organization for Standardization (ISO), as prepared by Dr. J. R. Scott, director of the Research Association of British Rubber Manufacturers, appears in the December, 1955, issue of Transactions and Proceedings, *publication of the Institution of the Rubber Industry. The sixth meeting of ISO/TC 45 was held from September 5 through 10 in Dusseldorf, Germany. Delegations from France, Germany, Italy, Netherlands, Switzerland, the United Kingdom and the United States were in attendance. There follows herewith the full report on the meeting:*

LATEX

The difficult problem of sampling commercial lots of latex was again discussed, and agreement was reached on methods suitable for drums and tanks, respectively. These methods give particular attention to means for stirring the latex to insure uniformity before taking the sample; this technique has been developed considerably since the corresponding British method (B.S. 1672, Part I) was published in 1950. Methods of determining density of latex will be studied by the Working Group.

The mechanical stability test outlined in the account of the 1953 meeting has now been accepted by ISO Members as a "Draft ISO Recommendation"; the methods for total solids, dry rubber content, alkalinity and KOH number are still in circulation for approval.

The Dusseldorf meeting agreed to define the scope of these latex tests as "natural rubber latex which contains preservative agents, and which may have been submitted to some type of concentration process; the tests are not necessarily suitable for latices from natural sources other than *Hevea brasiliensis* or for latices of synthetic rubber, compounded latex, vulcanized latex or artificial dispersions of rubber."

RAW RUBBER

Sampling of baled plantation rubber presents another major problem, and a document presented by the U. K. Delegation pointed out that this is largely because a commercial lot may be made up from several "lots" originating on different plantations, so that the heterogeneous composite lot is not amenable to the ordinary statistical laws of sampling. The Working Group will, however, continue its attempts to formulate a procedure, using the British (B.S. 1673, Part I) and ASTM methods as a basis.

The position regarding the Mooney viscosity test, left in abeyance in 1953, has advanced to the extent that a revision of ASTM Method D927, based on the American investigations reported at the 1953 meeting, will shortly be published, and will form the basis for further discussions by ISO/TC.45. It was agreed that this test should be regarded as applicable to all rubbers, whether natural or synthetic, raw or compounded.

Vulcanization testing of plantation rubber was discussed at length, the main points agreed being:

(1) To conform with ISO procedure the mixed stock (ACS formula) must be stored in a sealed container of small volume for not more than 72 hours before vulcanization (the object being to maintain it at a low humidity), although for routine classification purposes it may be kept in the normal laboratory atmosphere provided the period before vulcanization does not exceed one hour.

(2) The Mooney rate of cure test, based on the rate of increase of the Mooney viscometer reading, is accepted as a satisfactory method of evaluating vulcanizing characteristics (a measurement of modulus or a "strain" test at a fixed cure has previously been accepted).

(3) In view of the impossibility of strictly standardizing mixing and curing conditions between laboratories, the use of a standard reference rubber is a useful means of securing better inter-laboratory agreement, and the proposal by the U. S. Delegation for methods of preparing a stock of standard raw rubber are to be further studied.

Future work will deal with the details of mixing and vulcanizing test samples, the strain test, and Mooney rate of cure test, as well as determinations of ash, volatile matter and rubber hydrocarbon in raw rubber.

DIRT IN RAW RUBBER

Agreement was reached on a method based on the dissolution of the rubber in a solvent plus a peptizing agent, and filtering through a 325-mesh sieve. This will be circulated for approval as soon as the Working Group has finalized details of the method of homogenizing the test sample by milling.

COPPER AND MANGANESE

Methods of estimating traces of these metals were submitted by both the U. K. and U. S. Delegations, and it was agreed to put these forward as alternatives for approval by the Member Bodies of ISO. All these methods follow the general principles agreed at the 1953 meeting, viz., dry ashing to remove organic matter, conversion of copper into the colored diethyl- (or dibenzyl-) dithiocarbamate or manganese into permanganate (by oxidation with potassium periodate), and colorimetric estimation either with a calibrated absorptiometer or by comparison with standards made from known amounts of copper or manganese.

Since the 1953 meeting the Working Group has been considering the problem whether and how it is possible to distinguish between active or harmful copper and inactive copper. The U. K. Delegation presented a memorandum on this subject, in which it had to be admitted that such a distinction is not yet possible, but which was valuable in pointing out the following different forms in which copper can occur and the probable activity or otherwise of these forms:

(a) metallic copper; (b) copper alloys; (c) copper salts; (d) interstitial copper in a crystal lattice, where copper atoms or ions occupy interstices formed by absence of the normal ion and/or distortion of the lattice; (e) covalent copper compounds, where copper is attached to organic groups by homopolar covalent bonds instead of heteropolar ionic ones; (f) co-ordinated copper compounds, where the copper is held by covalent bonds plus additional bonds formed by electrons donated by other atoms.

The only form in which copper can be assumed to be harmless is the form in which it occurs in mineral fillers; co-ordinated compounds are usually inactive, though recent work has shown that some co-ordinated compounds (e.g., of iron) actively promote oxidation. This problem continues to be studied by the U. K. and other Delegations and a future meeting of ISO/TC 45 may well receive a report of useful progress.

AGING

The methods for oven and oxygen bomb aging outlined in the 1953 report have now, after some modifications, been agreed as Draft ISO Recommendations for circulation to ISO Member Bodies. The chief modifications concern the oven test, namely: (a) the distinction between "accelerated aging" and "heat aging" tests is now abolished; (b) the rate of air circulation is increased to "a slow circulation of air . . . of not less than 3 changes per hour." (Work in several countries has shown the rate to be immaterial within wide limits, though it is not yet known if there should be an upper limit.)

The description of the cell type of aging oven, already quoted in the account of the 1953 meeting, but with the air circulation rate altered as above, was accepted for circulation as a Draft ISO Recommendation.

The experimental work on light aging, planned in 1953, has been in progress since then, and an interim report was presented at Dusseldorf. This revealed the need for further work before a method can be finalized by ISO/TC.45.

Studies on the testing of ozone resistance have progressed sufficiently since 1953 to lead to the recommendation that the Delegations of ISO/TC.45 should submit reports on their experiences and results. It is hoped that these will enable the Working Group to draft a test method for submission to the next full meeting.

RUBBER-METAL BOND STRENGTH

The direct tension ("sandwich") and stripping tests have now reached the stage of Draft ISO Proposals, to be circulated to members of ISO/TC.45 for comment. These are based on ASTM D429-47T and D413-39, respectively. Some details have already been quoted, and the following additional features are now agreed:

Direct Tension Test: rate of separation of metal end-pieces, 2.5 cms/min.

Stripping Test: thickness of rubber 3 mm.; total width of rubber bonded to be 50 mm., with side portions cut away to leave 25 mm. test width.

LOW-TEMPERATURE RESISTANCE

The U. S. Delegation presented documents describing four methods of assessing resistance of vulcanized rubbers to low temperatures, using the four properties of impact brittleness, hardness, stiffness (torsion modulus), and compression set. These are based on ASTM Methods D746-52T, D676-49T, D1053-52T and D1229-52T, respectively. Attention was given primarily

to the impact brittleness test, the principle of which was accepted by most of the Delegations; the method based on this test will accordingly be circulated for approval.

Further experimental work was agreed to be necessary to decide if the International Rubber Hardness test (similar to that of B.S. 903: 1950) can be adapted for low-temperature work, and also to decide the merits of the torsion stiffness test as exemplified by the Clash-Berg, Gehman, and I.C.I. forms of apparatus, which have for some time been under investigation by members of the U. K. Delegation.

The Committee felt that further information is needed on the compression set method of assessing low-temperature behavior before this can be fully considered.

COMPRESSION SET

The U. K. Delegation presented results of tests made in several countries to decide the best height-diameter ratio for the test piece. Unfortunately, the results revealed serious discrepancies between laboratories, and the discussions were largely concerned with attempts to find the reasons for this and in planning further experimental work to clear up this problem.

CLASSIFICATION OF VULCANIZED RUBBERS

The difficult task of reaching a satisfactory compromise between the two existing systems of classifying rubbers by properties (ASTM D735 and Netherlands N1001) has occupied two meetings of the Working Group since 1953 and again led to considerable discussion at Dusseldorf. Progress was made to the extent of agreeing tentatively on the basic principles of such classifications, the properties to be taken into account, and the gradations of certain important properties (tensile strength, breaking elongation, hardness, abrasion resistance, tear strength).

TERMINOLOGY

The establishment of standard terms and definitions for the concepts used by the rubber technologist (or any other technologist for that matter) may seem at first a straightforward matter, yet in fact proves a most complex and far-reaching subject. Thanks to the excellent preparatory work of the Working Group, ISO/TC.45 was able to crystallize the aim of its work in this field into a definite proposition, namely, the preparation of a bilingual (French and English) list of rubber technological terms arranged in logical order, with a definition of each, and with equivalent terms in such other languages as Delegations may provide, plus alphabetical key lists in French and English.

ELECTRICALLY CONDUCTIVE RUBBER

The Working Group reported that tests by a method similar to Method 2 of B.S. 2044 had given good agreement between laboratories on rubbers of resistivity 10^2 to 10^7 ohm-cms. It was agreed that if further results confirm this, the method will be circulated as a Draft ISO Proposal. The Working Group will, however, continue to study the problem of pretreatment of the test piece.

More Rubber Auto Parts

According to the latest issue of "Us", company magazine of the U. S. Rubber Co., New York, N. Y., a 1956 car may have as many as 550 individual parts made by the rubber industry. This is more than three times the number used in 1930 and more than double the 1940 figure. The company states that one of the newest projects in its laboratories is the development of a fuel cell for car fenders. The new fuel cell, if adopted, could change the appearance of tomorrow's cars.

STANDARD LABORATORY ATMOSPHERES

A major problem in international standardization of tests is to decide on the appropriate temperature and humidity for conditioning of test pieces and for the atmosphere of the test laboratory. A difficulty immediately arises because the same conditions are not convenient for different parts of the world, and this was recognized in 1953 by allowing three alternative atmospheres: 20° ± 2°C. and 65 ± 5% R.H.; 23° ± 2°C. and 50 ± 5% R.H.; and 27° ± 2°C. and 65 ± 5% R.H.

At the Dusseldorf meeting it was reported that ISO had set up a special committee (ISO/ATCO) to consider the whole question of test conditions, and it was accordingly decided to await their recommendations before making a final decision. Meanwhile, for all mechanical tests at room temperature, it will be stated that a "standard laboratory atmosphere" is to be used, this being for the present interpreted as one of the atmospheres defined above.

To cover the more general case of testing at low, normal and elevated temperatures, the following list of standard temperatures will be submitted to ISO/ATCO as a basis for discussion: —55°, —40°, —25°, —10°, +20°, 23°, 27°, 50°, 70°, 100°, 125°, 150°, 175°, 200°, 250°C.

RESISTANCE OF RUBBER TO LIQUIDS

Tests for swelling of vulcanized rubbers in liquids were considered for the first time at the Dusseldorf meeting, when the U. K. Delegation presented a document giving three methods based, respectively, on measuring the change in volume, the changes in length, width and thickness of a rectangular test piece, and the change in length of a long thin strip. In accepting this as a basis for an ISO method, the Committee emphasized that change in volume or dimensions is not the sole criterion of resistance to a liquid. Accordingly, the Working Group (France, Germany, Netherlands, Switzerland, U. K. and U. S. A.) set up to deal with this subject will consider also the effects of swelling liquids on the mechanical properties of the rubber.

TENSILE TEST—SMALL TEST PIECE

The standardization of small dumb-bell test pieces that can be cut from finished articles has been under consideration for some time, but with pure gum and other soft rubbers difficulties have arisen in satisfactorily gripping the test piece. Various proposed forms of grip to overcome this were proposed, and the Working Group will use these to continue its studies on three selected dumb-bells: ASTM type "D" (D412-52T), Netherlands No. 4, and the Swiss "KTA."

MICRO-HARDNESS TEST

Since the 1953 meeting several Delegations have studied the micro test for hardness first introduced by Dr. S. Oberto. This is similar in principle to the International Rubber Hardness Test (and hence that of B.S. 903: 1950) but with the indenting ball reduced to one-sixth of the standard diameter and the loads reduced to give one-sixth of the indentation obtained in the standard test; the aim is to be able to test much smaller and thinner samples than is possible with the standard test.

Reports submitted from Italy, Netherlands, Switzerland and U. K. all showed that the micro test agrees well with the standard test. The only point not yet resolved is how thin the rubber can be made without affecting the reading. It would be expected theoretically that a thickness one-sixth of that used in the standard test could be used without the thickness effect becoming appreciable, but it is not yet clear whether this is so, and the main aim of the further work agreed at the Dusseldorf meeting will be to settle this point.

FLEX-CRACKING AND CRACK GROWTH

The methods using the De Mattia machine for assessing resistance to flex-cracking and crack growth, submitted by the U. K. Delegation, were accepted for circulation to ISO Member Bodies as Draft ISO Recommendations. These methods use the 3-inch length of test piece between the grips, so that with these at their maximum distance apart the test piece is just straight; the advantages of this over the 3¼ inch length hitherto used have already been pointed out.

The only technical detail still to be resolved is the permissible tolerance on the 3-inch maximum grip spacing, a question that has led to some argument because it gives a metric equivalent (76.2 mm.) which some continental authorities have wished to "round off" to 75 mm.; for the present this distance is specified as 76 + 0.2, —0.0 mm.

The German and U. K. Delegations described devices for insuring correct insertion of the test piece in the grips, either by having molded projections on the test piece or by using a metal template of the specified length with a projecting rib to fit in and locate the groove in the test piece.

UNITS FOR LINEAR DIMENSIONS

The "English versus metric" question has arisen so frequently in the discussions of ISO/TC.45 that it was decided to put it on the 1955 agenda as a subject in itself. The following proposals, developed from those put forward by the U. K. Delegation, were agreed:

(1) ISO/TC.45 recommends that all Delegates use the metric system to the

greatest extent possible in the development of new methods of test.

(2) The 1951 resolution that "where dimensions appear in the text the metric dimensions should be given first, being preceded by the word 'either' and followed by the word 'or' and the inch dimensions" be confirmed.

(3) For critical dimensions the exact equivalent for metric units be given in the inch system (in decimals) based on the following equivalence: 1 in. = 25.4 mm. (See Explanatory Note).

(4) For non-critical dimensions the equivalent in inches of the metric units be given in decimals based on the following technical equivalence: 1 in. = 25 mm.; 0.25 in. = 6 mm.

Explanatory Note

The units are fixed in millimeters by the simplest numbers required by the test conditions, without considering whether the corresponding inch units are whole numbers or fractions. This rule applies particularly in the case of tests utilizing new designs of apparatus or existing apparatus which can be adjusted. It is realized that this rule cannot be applied in the case of existing apparatus which is not adjustable. An adjustable apparatus is defined as one in which the adjustment can be made with existing parts. An apparatus is regarded as being non-adjustable if new fitments or parts would be required to make the adjustment.

The adoption of these simple rules in the future will, it is hoped, avoid much controversy over the definition of linear dimensions in metric and inch units. It is intended to draft similar rules for units of area, volume, and other quantities.

TEAR STRENGTH

Following the acceptance as a Draft ISO Recommendation of the method using the "Crescent" test piece (as in B.S. 903: 1950), the Netherlands Delegation reported further studies on the "Delft" test piece, recommending the dimensions already published. A method based on this test piece will therefore be submitted at the next meeting of ISO/TC.45. The Working Group will also consider the possibilities of a third method using the "angle" test piece.

ACCEPTANCE OF PREVIOUS DRAFT ISO RECOMMENDATIONS

As noted in the account of the 1953 meeting, draft methods for tensile, stress-strain, tear strength, hardness, rubber-fabric ply adhesion, abrasion (DuPont) and mechanical stability of latex were agreed for submission to all ISO Member Bodies for approval. ISO procedure requires that a majority of the 37 Member Bodies (i.e., national standardizing bodies) must approve a method before it is passed to the Council for acceptance as an "ISO Recommendation." A study of the 25 replies received showed that, with certain minor changes accepted by the Delegations, all these six drafts secured the necessary majority approval.

The only technical point arising and needing further consideration concerns the equivalence between the International Rubber Hardness Degrees (IRHD) and Shore A scales. It is known that on soft rubbers (say, below 50°) the IRHD reading tends to be above the Shore reading; indeed, on very soft rubbers this must be so because zero Shore is not "infinitely soft" but corresponds to about 5 IRHD. The U. S. Delegation felt it desirable to bring the IRHD and Shore scales closer in this soft range. Although this will mean slightly altering the IRHD scale, it does not change the method of test or the theoretical basis of this scale, and accordingly this alteration was agreed in principle. The exact extent of the alteration is being discussed between the U. K. and U. S. A. and a proposal will be circulated to ISO/TC.45 members.

Celanese Building New Labs

Celanese Corp. of America, New York, N. Y., has awarded a general contract for construction of the first unit of its new Development Laboratories at Charlotte, N. C. Construction will start immediately. Located on a 114-acre tract on Reid Road, approximately two miles from the company's office building in Charlotte, the new unit will be known as the Process Development Laboratory. It will have 30,000 square feet of floor space. The two-story main section of the L-shaped building will house offices, laboratories, and pilot plants. The one-story wing section will provide space for shops, storage and utilities. The building, scheduled for completion later this year, will have a structural steel frame with a front of buff Norman brick, similar to that used on the Celanese office building in Charlotte. Transite panels will be used for other exterior walls.

Phillips Licenses Pullman

Pullman, Inc., has announced that it has signed a license agreement with the Phillips Petroleum Co. to produce new types of polyolefin plastics. In announcing the agreement, Champ Carry, president, said that it is not possible to state accurately at this time when the new facilities required for production will be in operation but it will be at least 18 to 24 months. "This move, which continues our general policy of diversification, broadens the present base in the plastics field of our subsidiary, the M. W. Kellogg Co.," said Mr. Carry. "Kellogg was one of the pioneers in the development of the fluorocarbon resins and for the past seven years has been commercially producing various fluorocarbon products under its registered trademark—'Kel-F.' These include plastic molding materials, dispersions, oils, waxes, greases, inks, acids, and a specialty rubber. The Phillips Polyolefin Process differs from those used commercially for the production of hydrocarbon resins in that it employs an entirely new type of catalyst. This catalyst not only produces a unique type of polyethylene but it is also active in the copolymerization of mixtures of olefins. Our research and development staff visualizes that the Phillips Polyolefin Process will make not only a new type of polyethylene but will be the basis for developing a whole new spectrum of resins from olefins available from the petroleum industry."

GOODYEAR AIRCRAFT DEVELOPS EXPERIMENTAL INFLATABLE AIRPLANE

An inflatable airplane that can be deflated and packed in the trunk of the family car has been flown for the first time at the Goodyear Aircraft Corp., Akron, Ohio. Designed and developed by the company to test the possibilities of rubberized "Airmat" fabric as structural material for aircraft, the light-weight plane is made rigid by air pressure. Wing, tail assemblies and pilot's seat are made of Airmat material, a Goodyear Tire & Rubber Co. product consisting of joined layers of inflatable rubber-coated nylon fabric shaped by thousands of droppable pile threads. The craft's conical-shaped fuselage is made of airship fabric. Inflated, the plane resembles a glider with the pilot seated at the front of the ship. Deflated, it can be packed in a trunk. Less air pressure than that required to inflate passenger car tires is needed to pump up the plane.

The single-place, high-wing monoplane has a two-cycle, 40-horsepower motor mounted on a tubular support above the fuselage directly behind the wing. The only other metal support connects the wheels and pilot's seat with the fuselage. High-strength, fan-shaped patches of rubberized material are used to attach the various members, struts and other supports. Goodyear Aircraft designed and built the inflatable plane in a little more than 12 weeks. It is the first of its kind in the United States. Until further development is complete, disclosure of additional information is not contemplated by the manufacturer. Quantity production is not planned at this time, the company states.

Controlled Rubber Formed

J. Warren Sackett

Controlled Rubber Products, Inc., newly-organized manufacturing and custom engineering firm in the precision molded rubber field, has opened a new plant at 38403 Pelton Road, Willoughby, Ohio. Staffed with experienced personnel in the close-tolerance rubber molding business, Controlled Rubber is headed by J. Warren Sackett, formerly chief rubber engineer of Thompson Products. Prior to this six and one-half years with Thompson Products, Mr. Sackett was associated for two and one-half years with the B. F. Goodrich Chemical Co. Mr. Sackett is a graduate in chemistry of Ohio State University (1943). Controlled Rubber will manufacture close-tolerance rubber molded products for the trade. Emphasis is on high quality and fast delivery. The newly equipped plant with the latest high-speed production machinery was designed to provide the finest quality molded rubber output. Manufacturing for aircraft installation—requiring great tensile strengths, high resistance to heat and other destructive elements and extremely close tolerances—is a major activity at Controlled Rubber.

All production will be under strict laboratory control—a procedure used only rarely in the custom molded rubber business, the company states. In addition to manufacturing on custom and job orders, the company performs service functions in the rubber field. One division specializes in compound development. It also works as consultant and engineer in the development of specialized products and usages of rubber. A third division of Controlled Rubber carries on service engineering for clients in the molded rubber business.

Expanding Tire Production

General Tire & Rubber Co. of Akron, Ohio, has announced an expansion of its tire production facilities in Akron at a cost of $1,000,000. When completed by mid-summer, the project will increase the plant's capacity by 25%. All expenditures involved in the expansion are going into new machinery and equipment. Floor space is already available. As a result of the expansion, General Tire will be able to produce the largest size earth mover tires.

Buffington Named Vice-President

M. R. Buffington, formerly chief chemist of Lea Fabrics, Inc., Newark, N. J., has been elected vice-president and technical director of the company. After graduating from Bucknell University, where he earned a B.S. degree in chemical engineering, Mr. Buffington joined the Aetna Explosives Co. as a control chemist. In 1916, he joined the Goodyear Tire & Rubber Co., where he was employed in the analytical laboratory. Early in 1917, Mr. Buffington joined Phoenix Rubber Reclaiming. When World War I broke out, Mr. Buffington joined the U. S. Army and served as a lieutenant in the Ordnance Department.

After leaving the Army, he took graduate studies at the University of Pennsylvania and at Columbia University. In 1921, Mr. Buffington received his M.S. degree from Columbia. The following year he joined the Firestone Tire & Rubber Co., where he served in both the Analytical and Compounding Divisions. In 1924, Mr. Buffington came East and joined the Duratex Corp., the parent company of Lea Fabrics.

Through his years of association with Duratex and Lea, Mr. Buffington has been engaged in the development and compounding of coatings and adhesives, both solvent and water dispersed. He has also worked on the development of methods of application to fabrics.

Since 1935, he has been active in outside consulting activities. Mr. Buffington has been a member of the Association of Consulting Chemists and Chemical Engineers for the past ten years. He is also active in the Division of Rubber Chemistry, American Chemical Society, and the New York Rubber Group.

Mr. Buffington holds a number of patents covering such developments as mixtures of neoprene and chlorinated rubber for adhesives and coatings; cup and ring packings; rubber expansion joints; rubber bearings; a foam sponge process, and methods for the stabilization of rubber compounds.

Opens Plastics Laboratory

The Panelyte Division of St. Regis Paper Co., New York, N. Y., announces it is opening a thermoplastics laboratory at Richmond, Ind., where it has plants for injection molding and vacuum forming plastics. This new laboratory will be concerned with the development of new processes and applications for thermoplastics materials, and with the study of materials and equipment for use in thermoplastics manufacture. In addition, it will serve as the center of the engineering and development activities of the various thermoplastics plants of the Panelyte Division.

Minnesota Mining Promotes Gavin

Roy J. Gavin, vice-president of the Irvington Varnish and Insulator Division of the Minnesota Mining and Manufacturing Co. since 1953, has been named vice-president and general manager of the division succeeding Arthur E. Jones, who recently retired as president of the division.

American Biltrite Promotes Smith

Merrill M. Smith

Merrill M. Smith, formerly chief chemist, has been promoted to the post of plant manager of the American Biltrite Rubber Co., Trenton, N. J. Mr. Smith came from Fremont, Ohio, in 1952 to join American Biltrite as product development chemist, advancing the following year to chief chemist and production manager in charge of both rubber and vinyl floorings. Since joining Biltrite, Mr. Smith introduced the "Amtico" line of "Permalife" vinyl tile flooring, creating in cooperation with William Pahlmann, famous interior designer, the present range of colors. Mr. Smith was graduated from Northampton High School, and holds a B.S. degree in chemical engineering from Lehigh University. He continued his studies at Northeastern University in quality control.

Goodyear Eductional Program

A four-point educational program, designed to stimulate interest and encourage greater participation in scientific careers, has been announced by P. W. Litchfield, chairman of the board of the Goodyear Tire & Rubber Co., Akron, Ohio. The comprehensive one-year program, believed to be the first of its type sponsored by a rubber company on such a broad basis, provides for advanced technical training for full-time public and parochial high school mathematics and science teachers in Summit county, increases the enrollment and facilities of the Goodyear Apprentice School and the company sponsored Engineering Squadron training program and provides for financial aid to further the education of Goodyear personnel who are engaged in engineering and technical work at Goodyear plants located throughout the United States.

To Build Styrene Facility

Cosden Petroleum Corp., with a refinery at Big Spring, Texas, has announced plans for the construction of a styrene manufacturing facility as an addition to its refinery. The new facility is scheduled to be completed by December, 1956, at an estimated cost of $3,000,000. The plant will have an annual capacity of 20,000,000 pounds.

Heiberger Heads Plastics Research

Dr. Charles A. Heiberger, research director at the Ohio-Apex Division, Food Machinery and Chemical Corp., Nitro, West Va., for the past ten years, has been appointed manager of the Plastics and Polymers Department of FMC Chemicals Central Research laboratory now under construction at Princeton, N. J. Dr. Heiberger received his B.S. degree in chemical engineering at Lehigh University in 1935 followed by an M.S. Ch. E. degree in 1937 and a Ph. D. in organic chemistry in 1939. Prior to joining Ohio-Apex, he taught at Lehigh University for four years and was a group leader in the general laboratories of the U. S. Rubber Co. for six years. Pending completion of the FMC Chemicals Research Center at Princeton, Dr. Heiberger will be located at FMC Chemicals administrative headquarters in New York City. Paul E. Williard, assistant to Dr. Heiberger at the Ohio-Apex Division for the past five years, becomes director of research, Ohio-Apex Division of FMC. Mr. Williard graduated with a B.S. degree in organic chemistry from the University of Chicago in 1941, and was with the U. S. Rubber Co. general laboratories and the Plastics Division of the Celanese Corp. before joining Ohio-Apex.

Tubeless Tire Puncture Seal

What is said to be a revolutionary, 2-stop sealing plug for tubeless tire punctures has been developed by the Tyron Corp., Goodland, Kansas. The new 2-stop plug is similar to the former plug in that it is inserted into the puncture hole with an applicator rod and is hollow so that it will conform to the shape of the puncture hole. However, the new plug has a nylon tip, making it almost impossible to punch a hole through the tip with the applicator rod. The new 2-stop plug gives a better seal, the company states. The complete Tyron Puncture Repair System for tubeless or tube-type tires consists of pure latex rubber. This latex, plus the new plug, give a permanent seal, and the repair can be made without taking the tire from the wheel in less than five minutes, the company states. The latex alone can be used on tube-type tires, allowing them to be repaired in fifteen minutes without taking the tire from the wheel.

Appointed Rubarite President

Appointment of Emil R. Albert, Jr. as president and general manager of Rubarite, Inc., of Chicago, Ill., has been announced by the firm's board of directors. He succeeds Harold B. Pullar, who remains with the company as an officer and director. Rubarite is owned by National Lead Co., the Goodyear Tire & Rubber Co., and Bird & Sons, Inc. The firm produces a rubber additive used in asphalt and tar for road building operations, air strips and miscellaneous applications including fiber glass insulation, water proofing, undercoating of automobiles and roofing. Company headquarters, located in Chicago, shortly will move to Tulsa, Oklahoma. The firm's manufacturing plant, located at Malvern, Ark., markets on a national basis.

Love Named Factory Manager

Raymond J. Love

Announcement of the appointment of Raymond J. Love as factory manager of the Pequanoc Rubber Co., Butler, N. J., has been made by N. H. Tuthill, executive vice-president and general manager. Mr. Love joined Pequanoc in 1948 as an industrial engineer, and formerly had been associated with E. R. Squibb & Sons, New Brunswick, N.J. He is a graduate of Virginia Polytechnic Institute and resides in Summit, N.J.

Join Emery Sales Staff

R. G. Kelso and Richard H. Proctor have joined the sales staff of the Chemical Division of Emery Industries, Inc., Cincinnati, Ohio. After completing an orientation and training course they will be assigned to the field sales organization. Mr. Kelso holds a B.S. degree in chemistry and an A.B. degree in English from Morris Harvey College, Charleston, West Va. After graduating, he became associated with Carbide & Carbon's Research Laboratories in South Charleston, later transferring to technical sales where he remained until joining Emery. He is a member of the American Chemical Society, American Association of Textile Chemists and Colorists, Cincinnati Paint, Varnish and Lacquer Association and the Appalachian Geological Society. Mr. Proctor has a B.S degree in chemistry from Ohio University. After graduating in 1951 he joined Koppers Co., and became a group leader in that company's Monica, Penna., laboratories. Immediately prior to joining Emery he was with Fisher Scientific Co. in a sales capacity.

Goodyear Chemical Booklet

The Chemical Division of the Goodyear Tire & Rubber Co., has announced publication of "Harvest of Research: The Story of the Goodyear Chemical Division" by David Dietz. This interesting booklet relates the manner in which Goodyear entered into the field of chemical materials and the creation of the Goodyear Chemical Division. The account not only covers Goodyear's chemical activities in the rubber industry, but in the paint, plastics, paper and textile fields.

New District Sales Office

Columbia-Southern Chemical Corp., Pittsburgh, Penna., has established a new district sales office at Houston, Texas, according to Chris F. Bingham, vice-president in charge of sales for the firm. Previously, the Houston area was serviced through a branch of the Dallas district office. C. K. Ballard has been appointed district sales manager for the Houston district. W. J. Bramblett will serve as assistant district sales manager of the Houston office. A native of Mineral, Texas, Mr. Ballard joined Columbia-Southern at its Corpus Christi plant during 1934 following his graduation with the degree of B.S. in C.E. from the Texas College of Arts and Industries. After eight years service in various management capacities at Corpus Christi, Mr. Ballard was named chief process design engineer at Columbia-Southern's Lake Charles, La., plant. He was works manager at the Louisiana plant for six years and during the past year has served as manager of production for Columbia-Southern at the firm's Pittsburgh headquarters.

Polyethylene Plants for Brazil

The Union Carbide and Carbon Corp. and W. R. Grace and Co., have announced separate plans to build polyethylene plants in Brazil. Union Carbide will construct a plant with sufficient capacity to "satisfy completely the most optimistic estimates" of Brazil's needs for the next ten years. The location of the unit will be at Cubatao, near Santos, State of Sao Paulo, and ownership in it will be vested in a wholly-owned subsidiary. The plant will be adjacent to an ethylene unit maintained by the Brazilian Government's Petroleum Authority. W. R. Grace and Co. and a German firm, Farbwerke-Hoechst A. G. of Frankfurt, have formed a joint venture to produce a new type of polyethylene developed by the German company in a new plant to be constructed in Brazil. It has not yet been determined whether the new plant will be built on a site yet to be acquired or whether it will be adjacent to the jointly-owned facility now producing insecticides for the Brazilian market.

National Starch Appointments

Dr. C. G. Caldwell, vice-president-research of National Starch Products, Inc., New York, N.Y., has announced the advancement of Dr. A. I. Goldberg and O. B. Wurzburg, Jr., to be associate directors of research "in recognition of their outstanding contribution to National's research in the resins and starch fields." Dr. Goldberg joined National after having received his doctorate degree in chemistry from Polytechnic Institute of Brooklyn in 1947, along with related experience in the resin field. Otto Wurzburg has been specializing in starch research for National since graduating from the University of Michigan in 1939. Also announced by Dr. Caldwell, was the appointment of Fred Eastman as superintendent of process development. Mr. Eastman, a graduate of Purdue University, has been with National since 1939.

NSC RUBBER SECTION COMPILES INDUSTRY ACCIDENT STATISTICS

The Rubber Section of the National Safety Council, Chicago, Ill., has made available comparative data on accident frequency and severity rates in the rubber industry, basing the comparisons upon final figures for 1954. It will be noted from the table which appears elsewhere on this page that the rubber industry in 1954 had an accident frequency rate of 3.97. This is 14% less than in 1953 and 50% less than in the average of 1935-39. In 1954, the rubber industry had an accident severity rate of .39; 20% less than in the previous year and 47% less than in the 1935-39 years. The rubber industry as a whole, in 1954, ranked eighth in frequency and ninth in severity among 40 industries.

NSC advises that in the tire and tube category in 1954, the Memphis, Tenn., tire plant of the Firestone Tire & Rubber Co., established a record with 7,721,421 injury-free man hours. In the footwear category, the Naugatuck, Conn., footwear plant of the U. S. Rubber Co., recorded 10,250,000 injury-free man hours. As for industrial rubber goods, the Providence, R. I., plant of U. S. Rubber had 5,638,369 injury-free man-hours. In rubber reclaiming, the Buffalo, N. Y., plant of the U. S. Rubber Reclaiming Co., had 4,271,657 injury-free man hours.

The Rubber Section advises that at its last meeting, a new committee was established—Off-the-Job Safety. S. A. Wright (Inland Mfg.) has been named chairman of this new committee. Committee members include T. H. Boyd (Manhattan Rubber), and S. T. Borrows (Mansfield Tire).

Another new committee is Fire Safety. A. R. Pomeroy (Ohio Rubber) has been named chairman of this committee. Other members are G. H. Burkhardt (General Tire), Nick Hunter (Dunlop Tire) and J. J. Raytkewich (U. S. Rubber).

Bell Research Formed

The formation of a new organization, Bell Research, Inc., of East Liverpool, Ohio, has been announced by Richard Bell, president of Bell Clay Co., Gleason Tenn; Bell Minerals, West Paris, Maine; and Bell Kaolin Co. of Batesburg, S.C. The new company under the title of Bell Research, Inc., has purchased the Henderson Cone Co. and will continue to expand the production of pyrometric cones for the ceramic industry in the large, modern plant at Chester, West Va. The addition of Bell Research pyrometric cones to the well known line of Bell products makes it possible for Bell operations to render a more complete and efficient service to the rubber, ceramic, and chemical industries with another useful product to accompany the well known Bell clay, minerals and kaolin. Bell Research, Inc., is a West Va., corporation and will be headed by the following officers: Richard Bell, president; H. Russell Smith, vice-president and general manager; and J. W. Van Dyke, secretary.

Have some comments to make? Write a letter to the editor! (See page 824.)

RUBBER INDUSTRY ACCIDENT FREQUENCY AND SEVERITY RATES
AS COMPILED BY NATIONAL SAFETY COUNCIL

	No. of Units	1952-54 Average	1954 Deaths and Perm. Dis.	1954 All Injuries	1953-54 % change
		Frequency Rates			
Entire Industry	133	4.86	.32	3.97	—14
Rubber Footwear	12	2.19	.12	1.44	—41
Tires and Tubes	60	4.84	.28	4.21	—11
Industrial Rubber Goods	30	5.86	.70	4.88	—24
Not Otherwise Classified	31	5.73	.26	4.15	—22
		Severity Rates			
Entire Industry	133	.44	.27	.39	—20
Rubber Footwear	12	.16	.09	.12	—40
Tires and Tubes	60	.42	.34	.43	0
Industrial Rubber Goods	30	.72	.36	.49	—63
Not Otherwise Classified	31	.39	.16	.32	—26

Plastics Pipe Approval Seal

The Society of the Plastics Industry, Inc., and the National Sanitation Foundation jointly announced an Identification Program that will assure the public of a safe, uniform quality in plastic pipe identified by the Foundation for use in systems transporting drinking water. This program was effective February 1, 1956. The program for applying the National Sanitation Foundation Seal of Approval to plastic pipe, thus identifying it for use in the drinking water field, is the result of a research program of toxicity and taste studies which were made possible by the plastics industry starting more than three years ago. Today, as a result of this program, the public health and water department officials, the public, industry, and in fact, all users can now identify pipe that is free from any toxicity or effect on taste when used for drinking water. The Identification Program will automatically require testing of raw materials suitable for plastic pipe. Since it is expected that plastic pipe manufacturers will publicize the marking program and their participation in it, the public will soon recognize and require the Seal of Approval on the pipe they purchase. New materials, therefore, must pass the Foundation's tests.

Heel & Sole Institute Officers

At a recent meeting at the Waldorf-Astoria Hotel in New York City, the Rubber Heel and Sole Institute elected the following officers: *President,* Forest Moor (Gro-Cord Rubber); *Vice-President,* E. Colman Beebe (Beebe Rubber); *Secretary,* Dr. Robert A. Winters; *Treasurer,* M. J. Bernstein (American Biltrite). J. B. Reynolds (Hagerstown Rubber) was elected a director of the organization until 1959. The Elastic Colloid Research Corp., the Rubber Heel and Sole Institute's research agency, elected the following officers: *President,* David W. Bernstein (American Biltrite); *Vice-President,* I. B. Calvin (Bearfoot Sole); *Secretary,* W. P. Harty (Avon Sole); *Treasurer,* Forest Moor; *Assistant Treasurer,* E. Colman Beebe; *Assistant Secretary and General Manager,* Dr. Robert A. Winters. Mr. Moor and David W. Bernstein were elected directors of the organization until 1959.

Licenses French Concern

Phillips Petroleum Co., Bartlesville, Okla., has licensed Societe des Usines Chimiques Rhone-Poulenc of France to use the new Phillips-developed process for making rigid polyethylene. The agreement grants Rhone-Poulenc exclusive use in France of Phillips patents and technical knowledge for producing this new family of plastics. Rhone-Poulenc, with headquarters in Paris, is a leading European manufacturer of pharmaceuticals, chemicals, plastics and textiles. Phillips is constructing a 110,000,000 pound per year plant to produce its new polyethylene at its Adams Terminal chemical manufacturing site on the Houston Ship Channel. Demand for the product appears so great that license agreements have been made with W. R. Grace and Co., Celanese Corp. of America, Union Carbide & Carbon Corp., and Pullman, Inc. The new Phillips process makes products which have been proved stronger, tougher, and in some varieties more rigid than conventional polyethylenes, Phillips states. They have much better resistance to chemicals and to penetration by moisture, gases, and solvents. They do not become brittle at temperatures as low as 175°F. below zero. Contrary to conventional polyethylenes, which soften at temperatures below the boiling point of water, the Phillips products do not soften or deform at the 250°F. temperatures used for steam sterilization in food processing, in pharmaceutical manufacture, and in hospitals.

Okonite Buys New Plant

Okonite Co., Passaic, N. J., has purchased the former Studebaker-Packard plant at New Brunswick, N. J., for $4,205,000. The company announced that it would install modern cable manufacturing equipment, start occupying the property within three months and eventually employ 1,000 persons there. The 160-acre property, including buildings with a capacity of 430,000 square feet, had been purchased from Studebaker-Packard last November by a subsidiary of Volkswagenwerk G.m.b.H., German automobile manufacturers. This concern had planned to produce automobiles at the plant, but abandoned the idea as unprofitable for its model. Okonite bought the plant from Volkswagen.

Seanor Named Vice-President

R. C. Seanor

R. C. Seanor has been named vice-president in charge of engineering of Adamson United Co., according to an announcement by F. L. Dawes, president. Mr. Seanor has been with Adamson since 1946 in designing and building machinery for the rubber and plastic industries. Since 1950 he has been in charge of engineering at the Akron plant. Prior to coming to Akron, he was assistant chief draftsman with the Rolling Mill Division of the E. W. Bliss Co. at Salem, Ohio. The new vice-president is past chairman of the Akron section of the American Society of Mechanical Engineers and a member of the Ohio Society of Professional Engineers. A native of Delaware, Ohio, he received his bachelor's degree in mechanical engineering at Carnegie Institute of Technology and took graduate studies at Massachusetts Institute of Technology. He is a member of the Tau Beta Pi and Pi Tau Sigma honorary societies.

Crown Expanding Operations

Crown Rubber Co. of Fremont, Ohio, has put into operation what is said to be the largest single production unit in the world for the continuous coating of materials with foam rubber. The unit features the widest continuous stainless steel belt in the world, and makes possible the production of "Foamcote" products in continuous lengths in widths up to ten feet. In order to house the new unit, it was necessary for the company to add a new building to their present plant capacity. The fact that the unit can produce over one thousand one-piece, 9 by 12 foot carpet underlays on a single shift gives some idea of its tremendous capacity.

Cary Chemicals Announces Move

Cary Chemicals, Inc., has announced the removal of its sales and administrative offices to its plant in Milltown, N. J. Offices of the company were formerly located in Paterson, N. J. The new mailing address of the company is P. O. Box 1128, New Brunswick, N. J. The new telephone number is: Charter 9-8181. It is expected that the move will result in better and more efficient services.

Armstrong Straight Rib Tire

Armstrong Rubber Co., West Haven, Conn., has announced the "Armstrong Straight Rib Tire," designed especially for the front rolling wheels of trucks. The tire features perfectly straight ribs for greater resistance to front wheel wear. These straight ribs, combined with the special tread contour provide easier steering, greater maneuverability and longer tire life. Extra mileage skid depth, said to be 1/32 to 1/16-inch deeper than competitive brands, and "labyrinth type" grooves to prevent stone holding are additional features of this new tire. Built with Armstrong's "Rhino-Flex" construction including the "heat treated chemi-bond process" of specially developed multiple compounded carcass stocks, the Straight Rib tire has the strongest, most uniform carcass ever built, the company states, a carcass made to resist road shocks, withstand bruises, run cooler. This new tire also features Armstrong's extra tough compound in tread and sidewalls to resist cutting and cracking and harder, more rugged rubber stock in the bead area to eliminate working and scuffing where the tire meets the metal rim. Extra double insert plies locked in position by the regular plies in the tire, another Armstrong exclusive, distribute road impacts more evenly in addition to adding extra strength to the body of the tire. The extra beaker strip which is inserted on top of the carcass just under the tread, resists road shocks and impacts, giving this tire triple protection.

Availability of Propionaldehyde

Propionaldehyde produced at a large new Oxo unit at Texas City, Texas, is now being supplied in tank car quantities, according to an announcement by W. A. Woodcock, manager, Fine Chemicals Department, Carbide and Carbon Chemicals Co., New York, N. Y. Propionaldehyde is a broadly useful chemical raw material with applications that parallel those of acetaldehyde. With phenol, it makes resinous products; with ammonia it forms propylamines useful as rubber accelerators; and with formaldehyde it yields trimethyol ethane, a polyol intermediate for alkyd resins and in polyester resins for polyurethanes. Propionaldehyde undergoes aldol condensations to make higher alcohols, acids, aldehydes, and diols. It is a reactive intermediate and should be of broad general interest in chemical synthesis.

Emersol 213 Low Titer Elaine

Emery Industries, Inc., Cincinnati, Ohio, has added a new single-distilled oleic acid, "Emersol 213 Low Titer Elaine," to its line of fatty acids and derivatives. This new grade is identical to the standard "Emersol 211 Low Titer Elaine" except for a lighter color. With its price equal to that of Emersol 211, the new grade should offer considerable advantage to users of single-distilled oleic acids that can benefit from a lighter color. The narrow color specifications on Emersol 211 will remain unchanged to provide continued uniformity of color for the many uses where a lighter color is undesirable.

Named Institute Plant Manager

Fred C. Hands

Fred C. Hands, manager of Plant 3 of the B. F. Goodrich Chemical Co. since 1948, has been named plant manager of the Institute, West Va., synthetic rubber plant recently purchased from the government by Goodrich-Gulf Chemicals, Inc. Mr. Hands will be in charge of reactivation of the Institute plant which has been in standby since September, 1953. A graduate of the University of Illinois, Mr. Hands joined the B. F. Goodrich Co. in 1935 and served in the laboratory. In 1938, he moved to Goodrich Chemical. He held a number of positions before being named production manager at plant 3 in 1943 and plant manager in 1948. Mr. Hands is a member of the American Institute of Chemical Engineers and the Akron Rubber Group.

Plan Design Engineering Show

"Tomorrow's Products are Tomorrow's Markets" has been set as the theme for the first Design Engineering Show, at Convention Hall, Philadelphia, May 14-17. The Machine Design Division of the American Society of Mechanical Engineers will sponsor a conference on design engineering to coincide with the show. One hundred and fifty companies, of the expected 200, already have engaged space to present displays. Exhibits will include components, materials, finishes, shapes and forms, and services, which are used by design engineers to make end products for consumer and industrial use. Conference topics will include cost reduction in product design, finding and training men for the design engineering field, selection of engineering materials, the effect of miniaturization upon design, compensating employees for inventions, and the rights of a company employee in inventions he develops. About 2,000 experts from exhibiting companies will attend to answer visitors' questions.

Mohawk Rubber Plans Plant

Mohawk Rubber Co., Akron, Ohio, will begin production this fall at a tire plant to be established at West Helena, Ark. The new plant will contain 102,000 square feet of floor space and is being constructed at a cost of $700,000. The firm will employ 150 persons at the outset and will have an eventual payroll of 700.

Financial News

1955 PROFIT AND SALES VOLUME HIGHEST IN GOODYEAR HISTORY

Goodyear Tire & Rubber Co., Akron, Ohio, in 1955 achieved the largest volume of sales and the highest net profit in its 57-year history, according to P. W. Litchfield, chairman of the board. Consolidated net sales increased 25% to a new high record of $1,372,176,139 compared with $1,090,094,050 in 1954. It was the fifth year in succession that Goodyear sales exceeded the billion dollar mark. The previous sales peak of $1,210,508,783 was attained in 1953.

Net income increased 24% to a new high of $59,665,845 compared with $48,055,196 in 1954 and with the previous record of $49,323,167 in 1953. The 1955 net income was equivalent to $5.90 per share on 10,105,213 shares of common stock outstanding at the end of the year, including the 913,531 additional shares sold during the year. The 1954 earnings were equal to $4.54 per share based on the same number of shares.

Profits of foreign subsidiaries included in consolidated net income for 1955 amounted to $18,655,745, all free of exchange restrictions as of the year end. The 1954 consolidated net income included foreign profits of $20,190,989 and a recovery of $2,151,000 through remittances of foreign income previously restricted. In 1955 the reserve for foreign investments was charged with only $647,000 for devaluation of foreign assets last year compared with a charge of $5,771,000 the year before.

Full Capacity Operation

In reporting the record volume of sales and earnings, Mr. Litchfield said that Goodyear's manufacturing plants, both in this country and abroad, all operated at full capacity last year, and in nearly all cases have had substantial additions to their equipment to meet increased demands. This is continuing into 1956.

The current year starts out with full capacity production in nearly all lines, Mr. Litchfield said, but some falling off in the volume of original equipment tires is expected due to a corresponding slowing down of automobile production. The company, however, looks for continued prosperity in 1956 unless there is some drastic change in either the domestic or worldwide economic situation.

Capital expenditures on property for expansion, improvements and replacements in 1955 totaled $70,079,033, which includes $14,161,524 for the purchase of two synthetic rubber plants from the Government. This was more than double the $33,076,180 spent for property in 1954.

The company continued to maintain a strong working capital position in relation to expansion of plant properties and sales. Working capital at the end of 1955 rose to a new high of $460,552,750. The current asset ratio at the year-end was 6.2 to 1 compared with 4.4 to 1 a year ago.

In discussing the outlook for the rubber industry and the company, Mr. Litchfield pointed out that the use of rubber for many new products has increased faster than its use in tires. The use of plastics and synthetic resins is also increasing rapidly and the manufacture of these products is becoming a substantial division of the rubber industry.

The increasing importance of aircraft for national defense and future commercial air transport, as well as of guided missiles, provides a growing outlet for Goodyear products, Mr. Litchfield reported. The company is investing $3,000,000 in a new electronics laboratory in Akron and a smaller one in Arizona to provide facilities for the many engineers engaged in this line of work.

U.S. RUBBER PROFIT IN 1955 HIGHEST IN COMPANY HISTORY

Net profit and sales for the U. S. Rubber Co., in 1955 were the highest in the company's history despite flood losses that reduced net income by more than $5,000,000, according to an advance report to stockholders released for publication by H. E. Humphreys Jr., chairman of the board.

Net profit for the year was $33,559,000, a gain of 20% when compared with a profit of $27,959,000 in 1954 and 2.5% higher than the previous record of $32,732,000 set in 1953. Profit was equivalent to $5.24 a share of common stock compared with $4.29 a share in 1954 and $5.19 a share in 1953.

Sales for 1955 totaled $925,539,000, a gain of 18% compared with sales of $781,574,000 in 1954 and 9% higher than the previous record of $850,152,000 set in 1952. Profit amounted to 3.6% of sales in 1955, the same as in 1954.

Net flood losses were $5,146,000, equivalent to 95 cents a share of common stock, resulting from damage to five New England plants during hurricanes Diane and Hazel last fall. Flood losses before provision for federal income taxes and bonus amounted to $12,009,000.

Federal and foreign income taxes and renegotiation of defense business totaled $42,452,000 in 1955 compared with $26,564,000 in 1954. Net income before provision for taxes was $83,623,000.

At the end of the year, total current assets were $406,802,000 compared with $355,115,000 a year earlier. Total current liabilities for 1955 were $147,045,000 compared with $122,668,000. Net quick assets, therefore, were $259,757,000 at the end of 1955—$27,310,000 higher than at the end of 1954.

Long-term debt at the end of 1955 stood at $155,500,000 compared with $120,896,000 at the end of 1954. Earned surplus on December 31, 1955 amounted to $152,033,000 compared with $138,834,000 at the end of 1954.

GENERAL TIRE SALES IN 1955 SET NEW RECORD FOR COMPANY

General Tire & Rubber Co. of Akron, Ohio, marked its 40th year in business with all-time record consolidated sales and profits, William O'Neil, president, announced in its annual stockholders report. Consolidated sales for the year ended November 30, 1955, were $295,731,096, an increase of $78,744,986, or 36.3% over 1954, the company's best previous year.

The record consolidated 1955 sales figures, while including General's Canadian operations, do not include sales of affiliates in Mexico, Europe, South Africa or South America, nor those of RKO Teleradio Pictures, Inc., the company's wholly-owned radio and television subsidiary.

Net consolidated profits after taxes were $9,704,731, compared to $4,502,645 in 1954, or an increase of 115.5%. It represents an earning of $6.29 per share of common stock outstanding and compares with last year's figure of $3.18 per share of common stock.

"The unconsolidated earnings of General's radio, television and entertainment subsidiary were $2,106,369," Mr. O'Neil reported. Thus, the consolidated earnings plus the unconsolidated earnings of RKO Teleradio were $11,811,100, which after payment of $1,103,327 preferred stock dividends, give us an earnings of $10,707,773, or $7.83 per share of common stock compared with $4.30 for the previous year. This does not include our part of undistributed earnings arising out of our foreign operations."

Points to Company Growth

In pointing to the company's growth, and particularly in the tire field where overall tire sales for 1955 increased 24.5 per cent, Mr. O'Neil said:

"Our 1955 capital expenditure was in excess of $9,000,000 and to keep up with the anticipated future growth, we foresee an expenditure of more than twice that much for capital expansion in 1956."

Since the year's end, General has completed negotiations on unsecured loans for $30,000,000 at favorable rates with two banks and an insurance company, it was reported in Mr. O'Neil's letter. At November 30, General's working capital was $52,399,145, an increase of $7,671,317, and it will be further augmented by the $30 million borrowing. General's current assets are $122,800,564 and its current liabilities are $70,401,419.

"The growing strength of our distributors coupled with our entry into the passenger car tire original equipment field necessitate expansion of our tire manufacturing plant facilities," the General Tire president said. "Already additions have been made at a cost of several million dollars to both our Waco, Texas, and Akron plants preparatory for the greater 1956 needs."

In the near future, General Tire and El Paso Natural Gas Co. will begin construction at Odessa, Texas, of the first postwar, privately-financed and completely-integrated synthetic rubber operation. This multimillion dollar operation is expected to be completed by July 1, 1957.

"Our Plastics Division, world's largest

manufacturer of plastic film and plastic sheeting, our Aerojet-General Division, largest commercial developer and manufacturer of rocket propellants and components and rocket chemicals and our radio, television and entertainment subsidiary, RKO Teleradio Pictures, Inc., had excellent results in 1955 and we foresee even better operations in 1956," the General Tire president said.

The addition of Respro, Inc., merged into General Tire last October 10, the addition of Forrest Processing Company, purchased last November, and the new Flooring Division, started last November, will be important factors in the Plastics Division growth, Mr. O'Neil reported to his stockholders.

Plymouth Rubber Co.

Fifty-Two Weeks to November 26: Net income of $462,905, which is equal to 51c a common share, compared with $422,335, or 47c a common share for the fifty-two weeks ended November 26, 1954. The 1955 net income figure reflects a loss of $300,000 sustained as a result of flood losses at the Canton, Mass., plant. Net sales in the period ended November 26, 1955, amounted to $16,799,184, against $15,058,430 in the preceding fifty-two weeks.

United Carbon Co.

For 1955: Net profit of $5,560,201, which is equal to $4.66 a share, compared with $4,656,769, or $3.90 a share, in the preceding year. Net sales in 1955 totaled $50,087,818, against $34,401,333 in 1954. Profits in 1954 included non-recurring income of $549,353 from the sale of capital assets.

Monroe Auto Equipment Co.

Six Months to December 31: Net loss of $70,365, compared with a net loss of $2,057 in the last six months of the preceding year. Net sales in the six months ended December 31, 1955, amounted to $5,976,655, against $5,260,846 in the six months ended December 31, 1954.

Interchemical Corp.

For 1955: Net income of $4,748,000, which is equal to $6.34 a share, compared with $3,770,000, or $5.04 a share, in 1954. Consolidated net sales in 1955 rose to $100,489,000, 11.9% higher than the $89,803,000 recorded in the previous year.

National Automotive Fibres, Inc.

For 1955: Net income of $2,164,062, which is equal to $1.97 a share, compared with a net loss of $543,394 in the previous year. Sales in 1955 amounted to $83,482,551, compared with $56,688,095 in 1954.

American Felt Co.

For 1955: Net income of $595,000, which is equal to $2.74 a common share, compared with $537,005, or $2.40 a common share, in 1954. Net sales in 1955 amounted to $14,601,751, against $13,668,462 in the preceding year.

FINANCIAL BRIEFS

The board of directors of the U. S. Rubber Co. have declared a dividend of 50c a share on the common stock, from earned surplus as of December 31, 1955. The dividend was payable March 10 to stockholders of record February 20. The directors also declared two dividends of $2 each a share on the 8% first preferred stock, one to have been paid March 10 to stockholders on record February 20, and the other to be paid June 9 to stockholders of record May 21. These payments are to be made from net earnings of the company during the year 1955, thereby completing the payments of $8 a share for 1955.

The largest amount ever contributed by the management of the Landers Corp. to its employees' profit-sharing retirement fund was paid for 1955. As a result of successful operations in 1955, the profit-sharing payment for 1955 was six times greater than the first payment made when the plan originated 14 years ago. The 1955 payment was equal to 15% of the total wages paid to all employees eligible to participate in the fund.

The board of directors of the General Tire & Rubber Co., on February 7, declared a regular quarterly dividend of 50c per share upon the issued and outstanding $2.50 par value common stock of the company. The dividend was payable on February 29 to shareholders of record at the close of business on February 20.

A. L. Freedlander, president of the Dayton Rubber Co., has acquired through stock option, 2,485 common shares, increasing direct holdings to 28,103.

P. E. H. Leroy, vice-president of the Goodyear Tire & Rubber Co., has acquired through stock option 6,490 common shares, increasing his direct holdings to 12,400.

Plans Increased Activities

Plans to expand sales activities, increase productive capacities and realign sales territories in 1956 were disclosed at the annual sales conference of the Electric Auto-Lite Co.'s Wire and Cable Division, just concluded at the St. Clair Inn, St. Clair, Mich. D. M. Skirving, sales manager of the division, revealed that this year the company will triple the production of Auto-Lite 350 high temperature aircraft wire because of its successful reception since its introduction last May. Production of magnet wire and plastic wire will be doubled, he said. Auto-Lite currently is engaged in a million dollar expansion program at its Port Huron, Mich., plant in order to meet increased wire and cable demands, Mr. Skirving pointed out. Appointment of two persons formerly associated with the division's central sales office as field representatives who will call on industrial accounts was announced at the meeting. They are Virgil Steinmeyer, who will cover Michigan, northern Ohio, the Ft. Wayne area of Indiana, and Ontario, and S. W. Weidenbach, who will cover central New York, eastern Pennsylvania and northern Maryland.

Buys Alco Oil & Chemical

A group of Cleveland investors and management specialists has purchased, for an undisclosed sum, Alco Oil & Chemical Corp. of Philadelphia, 28-year old pioneer manufacturer of latex chemical compounds. This was announced by Arthur E. Jones, one of the founders, vice-president and treasurer, who continues as vice-president under the new ownership. Other than addition of three officers to fill vacancies, no changes in personnel or policies are contemplated, Mr. Jones stated. New officers of the company are William H. Coleman, chairman; Tinkham Veale II, president and treasurer; and A. A. Augustus, secretary. Mrs. Edna M. Jones, who has been secretary of Alco Oil, becomes assistant treasurer under the new arrangement. She is the wife of vice-president and founder Jones. In addition to the new officers, the purchasing group includes other partners in Ball, Burge & Kraus, headed by Peter Ball, senior partner.

President Veale believes that Alco Oil is on the verge of a substantial expansion program growing out of new products developed by the company's research department. Organized in 1928, Alco Oil has become one of the nation's major producers of latex chemical compounds. Starting as a one-man laboratory, the company has expanded into a continuous process manufacturing operation, with annual sales of about $5,000,000. The company has two plants in Philadelphia, and maintains warehouse and representative offices in New England, California and Akron, Ohio.

Seiberling Rubber Co.

For 1955: Net income of $1,127,085, which is equal to $2.35 a common share, compared with $215,789, or 2c a share, in the preceding year. Net sales in 1955 amounted to $45,987,064, contrasted with $35,714,299 in 1954. Sales figures in 1955 set a new company record. As of December 31, 1955, total current assets stood at $17,385,919, while total current liabilities amounted to $7,024,233. At the end of the preceding year, total current assets were $14,831,621, and total current liabilities were $4,682,900.

Armstrong Cork Co.

For 1955: Net profit of $14,542,289, which is equal to $2.83 a common share, compared with $11,913,676, or $2.45 a share, in the previous year. Net sales in 1955 amounted to $249,385,639, against $217,557,305, in 1954.

Michigan Chemical Co.

For 1955: Net income of $341,314, which is equal to 64c a share, compared with a net loss of $228,894 in the previous year. Net sales in 1955 amounted to $6,526,275, against $5,829,342 in 1954.

A fund of more than $900,000 for grants to over 100 universities and colleges in its annual program of aid to education has been announced by DuPont. The support is for the next academic year.

Names in the News

ISAAC B. GRAINGER, president of the Chemical Corn Exchange Bank of New York, has been elected a director of the Kerite Co., New York, N. Y.

JAMES S. REID, JR., has been appointed industrial relations manager of the Standard Products Co., Cleveland, Ohio.

JOHN J. EGAN, associated with the B. F. Goodrich Co. since 1951, has been named manager of the Washington, D. C., office of the International B. F. Goodrich Co.

JAMES P. LOCKWOOD has been elected treasurer of the Petro-Tex Chemical Corp., Houston, Texas. Mr. Lockwood is also secretary of the firm.

FRANK T. MAGENNIS, vice-president and general manager of the Goodyear Export Co., was recently presented with the "Orden al Merito," a Peruvian citation, for his work in improving road conditions in that South American country.

FRANCIS W. KAYSER, associated with Hewitt-Robins, Inc., since 1946, has been appointed sales manager in the New England area succeeding A. A. Beaulieu, who retired on February 1.

PAUL BECKER, until recently factory manager of the Hazleton, Penna., plant of the Wire and Cable Division of the Electric Auto-Lite Co., has joined the Rockbestos Corporation at New Haven, Conn., as vice-president in charge of manufacturing.

WALTER J. DUGAN has been appointed manager of sales development in the Marketing Section of the Silicone Products Department, General Electric Co.

JAMES FENTRESS, formerly director of economics planning for the Foote Mineral Co., Philadelphia, Penna., has been named general sales manager of the company.

JOHN F. SNYDER, JR., has been appointed works manager at the Kenton, Ohio, plant of the Durez Plastics Division, Hooker Electrochemical Co.

JOHN A. WILSON, with ten years' experience in legal and legislative work, has been elected assistant secretary of the Diamond Alkali Co., Cleveland, Ohio.

FRED P. DEMME has been promoted to the position of manager of market development for the Sharples Chemical Division of the Pennsylvania Salt Manufacturing Co. He formerly served as chemical products manager of Sharples amines and amine derivatives.

PITT B. HARRIS, associated with Hewitt-Robins, Inc., since 1947, has been appointed general sales manager of the Foam Products Division.

DR. F. S. ROSTLER, director of research of the Golden Bear Oil Co., has been elected an Associate of the Institution of the Rubber Industry, London, England.

DR. DALE E. MANCUSO has joined the Research and Development Department staff at the Glendale Plaskon Laboratory of the Barrett Division, Allied Chemical & Dye Corp.

EDMUND A. HINDERSCHEID, associated with the Firestone Tire & Rubber Co. since 1935, has been appointed manager of the Trade Sales Operating Department of the company.

DR. ARTHUR G. SCROGGIE, manager of the Characterization Laboratory of the Textile and Industrial Products Research Division, Textile Fibers Department, E. I. du Pont de Nemours & Co., Inc., has been chosen to receive the Harold De Witt Smith Memorial Medal by Committee D-13 on Textile Materials of the American Society for Testing Materials.

NOEL S. SIEGEL has been named a field engineering representative of the Lord Manufacturing Co., Erie, Penna., and has been assigned to the Chicago office, while JOHN A. BOWLER has been named to the field engineering staff working out of the New York office.

REUBEN W. ASKANASE, chairman of the board of the Pyramid Rubber Co., and AARON J. FARFEL, vice-president of the same company, have been elected directors of A. G. Spalding & Bros., Inc., Chicopee, Mass.

DAVID HEALY, who has been representing Taylor, Stiles & Co. in New York State north of New York City, and in parts of New Jersey for several years, has now added the five boroughs of New York City and Long Island to his territory.

DR. FREDERICK W. BREUER, until recently associated with the Armstrong Cork Co., has joined the Richmond Research Laboratory of the Stauffer Chemical Co. at Richmond, Calif. He will work in the general field of polymers.

NORMAN E. HATHAWAY, associated with the Oronite Chemical Co. since 1954, has been appointed coordinator of marketing for the company.

RICHARD J. COVENEY, associated with Arthur D. Little, Inc., since 1949, has been appointed a vice-president of the company.

HAROLD WADE, assistant manager of the Lexington Division of the Standard Products Co., Cleveland, Ohio, since December of 1954, has been named manager of the division.

Smith Named ASME Director

Dr. J. F. Downie Smith

Dr. J. F. Downie Smith, Dean of the Division of Engineering of Iowa State College, Ames, Iowa, has been elected a director of the American Society of Mechanical Engineers for a one-year term. Born in Scotland, Dr. Smith received a diploma from the Royal Technical College in 1923, and also received a B. S. degree with special distinction from Glasgow University that same year. Other degrees he has been awarded include an M.S. from the Georgia School of Technology, 1925; M.E. from Virginia Polytechnic Institute, 1928; S.M. from the Graduate School of Engineering, Harvard University, 1930; and Sc.D. from Harvard in 1933.

After serving an apprenticeship with the Albion Motor Car Co. in Scotland, he worked as a machine and tool designer until he entered the teaching field. For two years he was assistant professor of experimental engineering at Georgia Tech and for two years was an assistant professor of engineering drawing at V.P.I. He spent eight years at the Harvard Graduate School of Engineering as a national research fellow and as an instructor.

Dr. Smith then decided to enter industry and for four years was executive engineer of research and development for the Budd Manufacturing Co. For the next three years, he was chief engineer of the Aircraft Section of the United Shoe Machinery Corp., and for three years served as head of the Engineering Department of that company. In 1947, Dr. Smith resigned to come to Iowa State.

Dr. Smith's activities in ASME include past-chairmanship and research secretary of the Rubber and Plastics Division; past-chairman of the Machine Design Division; past-chairman of the Research Committee, and past-chairman of the Committee on Thermophysical Properties. He is a past-member of the Board on Technology and of the Power Test Codes Committee. He is a Fellow of the society.

Dr. Smith has also been active in the American Society for Engineering Education and in the Association of Land Grant Colleges and Universities. At Iowa State, in addition to his duties as Dean of the Division of Engineering, he is Director of the Engineering Experiment Station and of the Engineering Extension Service.

Obtains Control of BWH

American Biltrite Rubber Co. of Chelsea, Mass., has gained control of the Boston Woven Hose & Rubber Co., Cambridge, Mass., through the purchase of a majority of the latter's common stock. American Biltrite, although not identified at the time, made an offer to BWH stockholders in January through the Rockland Atlas National Bank of Boston, Mass., as agent, to buy 150,000 shares at $18.50 a share. BWH has 344,000 shares outstanding. Later, it was announced that more than 150,000 shares had been tendered and the offer closed. It is understood that the stock obtained under the offer, together with the shares previously held make American Biltrite the owner of more than 50% of the outstanding shares.

John M. Bierer, president of Boston Woven Hose, has announced that the following officers and directors of American Biltrite have been elected to the Boston Woven Hose board of directors: David W. Bernstein, Eliot L. Bernstein, Maurice J. Bernstein, Aaron J. Bronstein, Miah Marcus, Richard J. Marcus and Robert G. Marcus. They are in addition to the present directors: Mr. Bierer, Harvey W. King, Wilfred L. Larkin and James N. Mason. Maurice J. Bernstein was elected first vice-president and Eliot L. Bernstein, Miah Marcus, Richard J. Marcus and Robert G. Marcus were elected vice-presidents. Wilfred L. Larkin continues as treasurer, Alden S. Foss as assistant treasurer and clerk, and James N. Mason as executive vice-president.

To Build New Black Plant

Phillips Chemical Co. will construct a new 64,000,000 pound per year carbon black plant in the Gulf Coast area. The new plant will produce both "Philblack O" and "Philblack I," trade names for special carbon blacks developed through years of Phillips research. Phillips perfected in 1942 the first high-quality, high-yield black made by a furnace process from oil, the company states. The demand for these blacks has resulted in expansion of Phillips carbon black facilities near Borger in the Texas Panhandle to a present capacity of 290,000,000 pounds per year, making them the world's largest. Location of the proposed new plant in the vicinity of existing petroleum processing facilities in the Gulf Coast area takes into account the necessary factors of availability of feedstock and adequate water, rail and truck transportation facilities.

New Goodrich Philippine Plant

The new plant of the Goodrich International Rubber Co. in the Philippine Islands is about ready to go under roof and will be producing tires before the end of the year, according to Lewis C. Hayden, executive vice-president and general manager. The new plant will produce a full line of passenger and truck and bus tires with an expected output of about 500 tires a day. The plant will be the first large-scale rubber products manufacturing plant ever built in the Philippines. More than 600 persons will be employed.

Wallis Promoted By Stokes

Thomas E. Wallis

Thomas E. Wallis has been appointed assistant to the general manager of the Stokes Molded Products Division of the Electric Storage Battery Co., Trenton, N. J., it is announced by Stanley P. Fisher, general manager. Mr. Wallis, formerly sales division manager of Delaware River Terminal Corp., studied engineering at Pennsylvania State University and graduated from high school in Philadelphia, where he makes his home.

Dayton Increases Common Stock

Stockholders of the Dayton Rubber Co., Dayton, Ohio, have voted to increase the authorized number of shares of common stock from 900,000 to 2,000,000. A. L. Freedlander, president, told the stockholders that business for this year continues to look favorable over 1955, based upon sales and earnings for the first two months of the fiscal year. In overwhelming support of management proposals, the stockholders also approved the restrictive stock option plan for key employees and re-elected three directors, including Mr. Freedlander, for three year terms. The other two directors are William G. Pickeral, secretary and a director since 1924, and Bentley G. McCloud, a director since 1945. Eighty-four per cent of the stockholders voted, of which 96 per cent voted favorable on management proposals.

Announces Firm Name Change

American Maintenance Supply Co., 236 North Ave., Chicago, Ill., has announced a change in company name to Arrow Laboratories, Inc. The company, manufacturers of "Detero Wax Beads," will maintain its offices and plant at the same location. James A. Millner, president, states that there will be no change in company management or policy. The C. P. Hall Co. will continue as distributors of the product.

Linear, Inc., Philadelphia, Penna., has announced that compound 7402-70 has been approved by the U. S. Air Force for conformance to MIL-P-18017A. This specification establishes the requirements for packings used in aircraft hydraulic systems.

Named European Agent

The Saint-Gobain Co., a leading European manufacturer of glass and industrial and agricultural chemicals, has been appointed exclusive agent in France and Spain for the sale of the M. W. Kellogg Co.'s line of fluorocarbon products. Marketed in the U. S. under the trademark "Kel-F," these include molding and extrusion materials, dispersions, oils, waxes and greases, acids and inks. Saint-Gobain whose experience in glass dates from the 17th Century and in chemicals from the early 19th Century with the establishment of soda-ash facilities for plate glass manufacture, entered the plastics field during the mid-1940's with the production of polyvinyl chloride. Three plants—at St. Fons, Chauny and Montlucon—now produce base resin, compounds and finished forms as well as phthalic anhydride and maleic anhydride. With the new fluorocarbon imports, Saint-Gobain extends the temperature and corrosion resistance range of materials available in Europe to meet the demands of the continent's rapidly expanding industries. The firm also manufactures silicones in association with Dow Corning, monomeric vinyl chloride and vinyl polymers under its own process, and imports a number of U. S. products.

Piccopale A-1 Emulsion

A new low-cost, quality-improving modifier, "Piccopale A-1 Emulsion," for rubber-base paints, recently introduced by the Pennsylvania Industrial Chemical Corp., Clairton, Penna., is said to give latex paints outstanding resistance to soap, water and alkalies. Two years of laboratory development, and exhaustive field tests by large paint manufacturers, have demonstrated conclusively that Piccopale A-1 Emulsion improves paint quality and reduces costs, the firm states. Other advantages to latex paint manufacturers gained through the use of the modifier are: it is compatible with thickners and protective colloids; it has excellent package stability and is non-creaming at 50% and 10% of solids; and it is of uniform particle size—under 1.0 micron. Paint users find that addition of the modifier permits easy removal of soil, it permits permanent film flexibility, it improves initial adhesion, and it has early water resistance.

New UOP Rubber Antiozidant

The commercial availability of a second powerful rubber antiozidant—"UOP 288"—has been announced by the Universal Oil Products Co., Des Plaines, Ill. Coincident with the announcement, Universal also disclosed that it has commissioned a large new plant of modern design for the production of both UOP 288 and UOP 88 to meet the rapidly increasing demand. The new facility is at McCook, Ill. UOP 288 is an isomer of UOP 88. Like UOP 88, the new compound is used specifically to retard ozone attack in rubber goods. Also like its companion product, UOP 288 is a heat stable material. This gives it an important advantage, the company states, for use in automobile tires and other rubber goods which may be subjected to relatively high temperature.

for the Best in Rubber and Plastics...

for example

HARD RUBBER DUST

Muehlstein offers complete grinding facilities and strict laboratory control for hard rubber dust — manufactured and ground to your specifications. You have your choice of all standard grades regularly available. Don't forget, too, Muehlstein offers you a complete technical service with modern, newly-expanded laboratory facilities ready to help solve your manufacturing problems.

Other Muehlstein products include Virgin and Reprocessed Plastics • Scrap Rubber • Crude Rubber • Synthetic Rubber.

Regional Offices:

- Akron
- Chicago
- Boston
- Los Angeles
- Toronto
- London

Warehouses

- Akron
- Chicago
- Boston
- Los Angeles
- Jersey City
- Indianapolis

H. MUEHLSTEIN & CO.

60 EAST 42nd STREET, NEW YORK 17, N. Y.

News in Brief

Conserved fruits are now being packed in clear, rigid plastic containers made of Geon vinyl resin.

A new hydraulic tire changing tool, termed an "outstanding development" in reducing costly down-time for big earth-moving vehicles, has been announced by Goodyear. It was designed particularly for the new tubeless earthmover tire and rim assemblies recently introduced by the company.

According to an estimate by Goodrich, a record 15,000,000,000 elastic bands will be made this year.

Advance Solvents has announced "Advastab C-77," a complex organic cadmium stabilizer which does not contain any fatty acids. It has a specific gravity of 1.057 at 20°C.

Pennsylvania Industrial Chemical Corp. has announced the opening of a new warehouse in Cincinnati, Ohio. This is the thirteenth company warehouse and the fourth new one opened in the past few months.

National Safety Council has just published a new and greatly expanded edition of its "Accident Prevention Manual for Industrial Operations." Copies of the 1,341 page manual are available from NSC at $13.50 each.

Martin Rubber Co., Long Branch, N. J., has made available its new catalog covering products produced by the firm. The catalog is entitled "The Martin Line."

Tools with surfaces exceptionally able to withstand hard wear are provided by three epoxy resins added to the plastic materials line of the Marblette Corp., Long Island City, N. Y. The new formulations are die laminating resin No. 602, die surface coating resin No. 612-B, and die surface coat resin No. 613.

DuPont was owned by 159,009 stockholders as of December 31, 1955, an increase of 3,712 over the number of holders recorded at the close of the third quarter of 1955, and an increase of 9,595 over the number as of December 31, 1954.

Precision Scientific Co., Chicago, Ill., has published Bulletin 668, a two-page leaflet describing the Hy-Temp Aging Bath. Copies are available from the company.

Pennsylvania Industrial Chemical Corp. has announced the opening of a new warehouse in Detroit, Mich.

A data sheet on its line of "Multi-V" belts has been released by the Industrial Products Division of the B. F. Goodrich Co. Copies are available without charge.

"Release Agents Lead to Stress Cracking of Polyethylene Film" is the title of a new technical report published by the Bakelite Co. Ask for Technical Release No. 5.

A detailed review of the servicing, repair and advantages of tubeless truck tires is contained in a new 12-page booklet entitled "All You Need to Know About Tubeless Tires for Trucks" available from Goodrich.

Providing fifty successful suggestions for safely handling and storing chlorine in 100 and 150-pound cylinders and ton containers, a new wall chart has been issued by the Diamond Alkali Co.

Reductions in the prices of tertiary-butylamine and "Primene 81-R" have been announced by the Rohm & Haas Co. The former has been reduced by nearly twenty cents a pound and the latter by seven and one-half cents a pound.

A new label adhesive, "Labelgrip", which will adhere to any surface including plastics such as polyethylene, vinyl, styrene, and rubber, has been introduced by the Adhesive Products Corp., New York, N. Y.

A new nylon cement that requires no curing has been developed by the Ions Exchange Corp., New York, N. Y. The new cement is available in a wide range of viscosities.

Harwick Standard Chemical Co., Akron, Ohio, has released technical bulletins on three "Synvar" resins: "Synvaren PLS-R," "Synvaren 631" and "Synvarite BRLD." Copies of the bulletins are available from the company.

Alliance Rubber Co., Alliance, Ohio, has introduced a new retail carton display which, it is stated, will stimulate an increase in the consumer sale of rubber bands.

Features and specifications of the new Fawick High-Speed Clutch Controls are described in a new bulletin published by the Fawick Airflex Division, Fawick Corp., Cleveland, Ohio. Ask for Form ML-134.

Fisher Scientific Co., Pittsburgh, Penna., has announced the availability of a new edition of the Fisher Laboratory Emergency Chart.

Rubba, Inc., New York, N. Y., has announced the development of "Rubbakote," a liquid rubber coating which is said to prevent corrosion in electro-plating tanks.

Goodrich Chemical has issued a new Hycar Latex Chart which presents, in summary form, physical properties and suggested fields of application for various Hycar latices.

"Polyseam", a new adhesive for polyurethane foam, has been introduced by Anchor Adhesives Corp., Flushing, N. Y.

Extruderitems No. 3, a publication of the Bakelite Co., New York, N. Y., discusses a new Bakelite polyethylene compound designed specifically for the extrusion of high quality pipe.

The publication of a new safety data sheet on naphthalene has been announced by the Manufacturing Chemists Association, Washington, D. C. Ask for Sd-58.

A new data chart listing technical data and application suggestions covering thirty adhesive formulations for bonding plastics and metals to themselves and to each other has been issued by the Rubber & Asbestos Corp., Bloomfield, N. J.

Geigy Industrial Chemicals, 89 Barclay St., New York 8, N. Y., has made available its "Sequestrene Bibliography" covering the years 1953-54. Copies are available from the company.

Mastic Tile Corp. of America, Houston, Texas, has developed eleven new colors of "Matico" rubber tile.

Now available from the Marblette Corp., Long Island City, N. Y., is a new collection of "Metal Forming Bulletins", outlining the manufacture, uses, and advantages of plastic draw ties, stretch press dies and hydro-form dies.

The plastic Wall Tile Division of the Society of the Plastics Industry, Inc., New York, N. Y., is celebrating its tenth anniversary by commencing an extensive public relations and merchandising program designed to help extend its market for quality plastic wall tile.

"How Thick Should a Rubber Roll Covering Be?" is the title of a new bulletin published by the Rodney Hunt Machine Co., Orange, Mass. Ask for Industrial Roll Engineering Report No. 8.

A new seal, developed by Industrial Accessories, Inc., Matawan, N. J., consisting of a neoprene case molded in two pieces and lined with a shell of phenolic resin for reinforcement, finds use in coils, capacitors, resistors, and small transformers.

A new type of greenhouse made of Bakelite polyethylene film is being employed in agricultural tests at the University of Kentucky's Agricultural Experiment Station in Lexington, Ky.

Adhesive Products Corp., New York, N. Y., has announced the development of "Metagrip", a new improved adhesive for the jewelry trade.

Haartz-Mason, Inc., Watertown, Mass., is now manufacturing newspaper blankets made from Hycar. The blankets act as a mild shock absorber in providing backing for printing operations.

Still Available—

Second Edition of

LATEX IN INDUSTRY

By ROYCE J. NOBLE, Ph. D., F. I. R. I.

The first edition of this valuable book was published in 1936 and has been out of print for many years. Accordingly, the publication of a completely revised and enlarged edition is welcome news to the thousands of users of rubber latex who have been seeking an up-to-the-minute text book.

The author has kept posted on every phase of the latex industry since the first edition and has incorporated in the new edition complete details on all current uses of this versatile material. The book is replete with illustrations, charts, formulas and full descriptions of the various processes in use today.

920 Pages • 6 x 9 Inch • 25 Chapters

Bibliography • Author Index • Subject Index

PRICE: $15.00 Postpaid in U. S.
$16.00 Postpaid in All Other Countries

Published by

RUBBER AGE

101 West 31st St. New York 1, N. Y.

Opens Acetylene Products Plant

Manufacture of high pressure acetylene products on a full commercial scale for the first time in the United States got under way at Calvert City, Ky., on February 28, when operations were started at the new $6,000,000 plant of General Aniline & Film Corp. The new operation is the result of 14 years of research, pilot plant production and market development. In announcing the start of production John Hilldring, president of General Aniline, said: "The plant represents a most important step forward in a vast new field of chemistry in this country." Philip M. Dinkins, vice-president in charge of operations of the Dyestuff and Chemical Division which will operate the plant, says that "A widespread industrial acceptance has already been achieved for the products to come from these new manufacturing operations." A pilot plant for the acetylene derivatives has been operated by General Aniline at its Linden, N. J., installation since 1947 and a great many of the new products have been manufactured there in semi-commercial and laboratory quantities. With full scale commercial production now under way, these products will be available to American industry at new low commercial prices and in multimillion pound quantities.

Sets Ethylene Oxide Expansion

Another step in a major ethylene oxide expansion program has been announced by H. B. McClure, president of the Carbide and Carbon Chemicals Co., New York, N. Y. Provision for the additional production of 65,000,000 pounds of ethylene glycol per year is being made at the Seadrift, Texas, plant. This extra capacity, announced less than a year after start-up of the original plant, brings total capacity for ethylene oxide in this single plant to more than 200,000,000 pounds per year. The production of ethylene oxide and the glycols from this expansion, together with the output of Carbide's plants at South Charleston, and Institute, West Va.; Whiting, Ind.; Texas City, Texas, and from the new plant at Torrance, Calif., will provide a total supply amply adequate to meet expected market demands for some time. Completion of the new facilities at Seadrift are expected in the fall of this year. The new Torrance plant is due to start up production units this spring.

Named Polymer Research Manager

Dr. Kurt Frisch has been appointed manager of polymer research at Wyandotte Chemicals Corp. He will be responsible for supervising and coordinating research work on the development and application of synthetic resins based on intermediates produced by Wyandotte Chemicals. Dr. Frisch attended the Universities of Vienna and Brussels and obtained a Ph.D. degree from Columbia University. Before joining Wyandotte, Dr. Frisch served as assistant manager of research at E. F. Houghton & Co. He has also had extensive experience in polymer chemistry with the Chemical Division of the General Electric Co.

Executive Changes at Landers

Following the annual stockholder meeting at which all directors were re-elected, Robert G. Landers, president of the Landers Corp., Toledo, Ohio, announced four executive changes: John C. Siegmann, formerly secretary and treasurer, was elected vice-president, secretary and treasurer; Frank W. Baker, vice-president, was named general consultant to the firm; Leonard E. Canner, plant manager, was elected assistant vice-president; and Timothy Y. Hewlett, Jr. formerly assistant purchasing agent, was elected assistant secretary and appointed general purchasing agent. All other officers were re-elected—Mr. Landers, president; John P. Howland, executive vice-president, James L. Davison, assistant vice-president and H. R. Ganshow, assistant secretary and assistant treasurer. Directors re-elected were Mr. Landers, Mr. Howland, Mr. Siegmann, Mr. Baker, Henson L. Jones and Willard I. Webb, Jr.

Mr. Siegmann started with Landers in 1926 as a factory employee and was later transferred to the accounting department. He was progressively assistant treasurer and general purchasing agent. In 1954, he became secretary and treasurer after the retirement of Percy E. Roper. Mr. Baker, a veteran of thirty years service with Landers, is widely known in the coated fabric industry. Mr. Canner joined Landers as assistant plant superintendent three years ago. He had previously been with Plymouth Rubber Co. of Canton, Mass., and had served five years in the U. S. Navy in World War II. Mr. Hewlett, a native Toledoan, joined Landers in January, 1954 as a management trainee. He had formerly been in the financial department of Harris-Seybold Co. and with Owens-Corning Fiberglas.

Producing Metallized Plastics

Foiltone Products, Inc., Cambridge, Mass., a wholly-owned subsidiary of the National Research Corp., also of Cambridge, is now producing metallized plastics and will soon offer metallized papers. The metallized plastics which the company is now offering include "Mylar" and cellulose acetate. In addition, the company will soon offer metallized polyethylene and vinyl films.

"Leaks, eh? Well, sell it as a lawn soaker, then!"

Plastics House Competition

Plastics suitable for housing are documented and indexed in a new architect's reference file compiled by the Society of the Plastics Industry, Inc., and available to entrants in the recently announced SPI Plastics House Competition. About 75 companies are represented in this file that lists resources for technical and non-technical literature and includes magazine articles showing fabrication and installation of plastics for building. The Plastics House Competition is offering 12 prizes to architects, designers, draftsmen and architectural students. This competition is aimed at developing ideas for new uses of plastics which will provide increased livability, comfort, safety and value in the construction of homes. Sponsored by the Society of the Plastics Industry, Inc., the SPI Plastics House Competition has been approved by the Committee on Architectural Competitions of the American Institute of Architects. Entry forms and all details of this competition are available from James T. Lendrum, A. I. A., Professional Advisor, SPI Plastics House Competition, Mumford House, University of Illinois, Urbana, Ill.

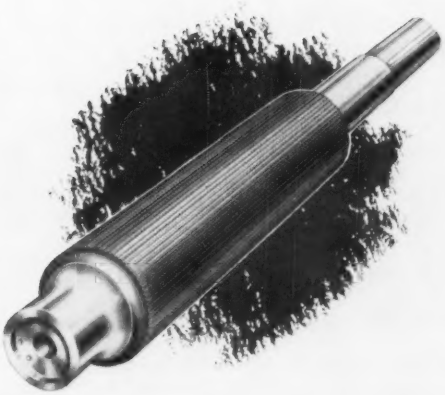
Whitman Laboratories Formed

Announcement of the formation of Whitman Laboratories was made recently following a meeting of the incorporators and stockholders in Norwich, N. Y. Whitman Laboratories will engage in the manufacture and sale of chemicals and food products, initially concentrating its activities in the industrial chemical field. The company will act as exclusive mid-western, western and southern sales agent for Beech-Nut Packing Co. on vinyl acetate resins. In addition, Whitman will serve as national broker for Sheffield Chemical, Division of Sheffield Farms Co., Inc., on industrial caseins and will represent nationally Chemo Puro Manufacturing Corp. on industrial preservatives and chemicals. Fields covered will include rubber, paper, paint, adhesive, textile, floor covering, leather and printing. Officers of Whitman Laboratories are John G. Brereton, president and treasurer; Walter B. Kinney, vice-president, and Elizabeth F. Brereton, secretary.

Avon India Modernizing

Avon India Rubber Co. of Melksham, England, has engaged the services of Hale & Kullgren, Inc., Akron, Ohio, and F. I. Honderich, in a project to modernize its plant. The plant modernization is to be patterned after the Natchez, Miss., plant of the Armstrong Tire & Rubber Co., the engineering of which Mr. Honderich managed from the drawing board to full production operation. Mr. Honderich served at Natchez as chief engineer from the establishment of the plant in 1940 to his retirement in 1955. When Hale and Kullgren were contacted by the English company, it was specifically requested that an engineer be obtained who could engineer a plant comparable to the Natchez plant with its features of straight flow progressive production and a specially designed power plant.

ARE YOU GETTING THE LONGEST POSSIBLE SERVICE LIFE FROM YOUR ROLLS?



You may be getting average service life from your chilled iron rolls, when you might be getting higher than average from a more metallurgically suitable roll.

We would like to have our metallurgists study your roll requirements. They may be able to recommend an alloy iron roll that will stand up much longer under the higher pressures, greater speeds and abrasions to which rolls are now subjected in processing rubber and plastics.

This may result in considerable savings through reduced down time and longer intervals between roll grinds.

The fact that so many long-established companies are users, and have been users of National rolls for almost 50 years is proof of their metallurgical correctness and precision finishing. They can be furnished to your specifications.

So the next time you are ordering iron or alloy iron rolls, call on National Roll & Foundry for their recommendations.

NATIONAL ROLLS

THE NATIONAL ROLL & FOUNDRY CO.

A wholly-owned Subsidiary of General Steel Castings Corporation

AVONMORE (Westmoreland County), **PENNSYLVANIA**

Specialists in Iron, Alloy Iron and Steel Rolls, Carbon, Alloy and Manganese Steel Castings

West Coast News

Establishmem in Los Angeles of a technical staff and principal facilities for the production of fuel cells has been announced by the B. F. Goodrich Co. Coincident with the announcement are two management assignments: J. Terry Taylor has been appointed manager of fuel cell operations and David L. Haines becomes technical manager of fuel cell design and engineering succeeding Mr. Taylor in that post. Both will headquarter at the Goodrich Los Angeles plant where Mr. Taylor will be responsible for all manufacturing functions involved in fuel cell production.

The company discontinued fuel cell production in Los Angeles after World War II. Production has been resumed with new and modern facilities. Fuel cells are flexible rubber fuel containers for military aircraft and certain other vehicles used by the Armed Forces. The Los Angeles plant, established in 1928, is mainly devoted to the production of tires.

Standard Products Co. of Cleveland, Ohio, will expand its West Coast Division through immediate construction of a 50,000-square foot plant at Fullerton, Calif., according to J. S. Reid, president. The new plant will be nearly triple the size of the present West Coast plant at nearby Long Beach, Calif., and an increase in employment is expected following its completion this summer. It will be one-story, on a six-acre plot in a fast-growing industrialized area, and has been designed to permit future expansion to double its initial size.

"Our West Coast Division was established in 1949, just six years ago, and has grown beyond our expectations. The building of the new plant indicates our faith in the future growth and progress of West Coast business and opportunity," Dr. Reid said. "The enlarged new facilities will permit us to manufacture additional products for our automobile company customers, and to diversify our services to other industries," continued Dr. Reid.

Stauffer Chemical Co. has changed the name of its Western Pacific Container Division to the Molded Products Division, effective February 15. Located at Vernon, Calif., the division is engaged in the manufacture of hard rubber and plastic battery cases and parts, and molded products for home and industry. The division is also installing new machinery at its plant to increase production. The expansion will provide for mixing colored stocks and will further improve quality control.

Halsey Burke, vice-president of the Burke Rubber Co., San Jose, Calif., has been chosen "Young Man of the Year" for 1955 by the Junior Chamber of Commerce of San Jose. Mr. Burke, 33, was honored for the commnity improvement projects he has sponsored in San Jose during the past four years. Mr. Burke, as president of the organization in 1951,

Halsey Burke

began many community activities which have since gained wide recognition. Mr. Burke served as Junior Chamber of Commerce first vice-president in 1950-51 and was "Director of the Year" in 1951.

A graduate of Kings Point Academy, Long Island, N. Y., Mr. Burke spent five years in the Maritime Service during World War II. He received his master's papers at the age of 21 and was one of the youngest captains of a Liberty ship in the war. He is now a lieutenant commander in the Naval Reserve. Last year he qualified for a private pilot's license and now is working for a commercial pilot's license.

Appointment of George B. Leighninger as manager of its Los Angeles branch office, has been announced by Stein, Hall & Co., Inc. Mr. Leighninger, who since 1954 served as assistant manager of the firm's Chicago Branch, joined Stein, Hall in 1948 as a sales trainee. A graduate of Northwestern University in 1947, Mr. Leighninger assisted the advertising manager of the Well Lamont Corp., Chicago, Ill., prior to joining Stein, Hall.

As a salute to the West Coast rubber industry, "Rubber Week" was observed in Los Angeles, Calif., the week of February 5 to 12 according to a proclamation issued by Mayor Poulson. The growth and problems of the rubber industry were reviewed throughout the week by members of the Los Angeles Rubber Group. A highlight of Rubber Week was a dinner for Los Angeles Group members at the Hotel Statler on February 7. TLARGI members were also honored at a Chamber of Commerce luncheon on February 10th at the Hotel Biltmore.

Several local rubber companies, including Goodyear, Goodrich, Firestone, U.S. Rubber and Voit Rubber scheduled plant tours during the week. Visitors were also invited to tour the research laboratories of the TLARGI Rubber Technology Foundation at the University of Southern California.

Seven California plastics manufacturers plan to take part in the upcoming Seventh National Plastics Exposition and Conference sponsored by the Society of the Plastics Industry, Inc. This is the largest Western delegation ever to take part in an S.P.I. national exposition. The exposition and conference will take place at the Coliseum in New York City on June 11 to 15. The California firms scheduled to attend the exposition and conference include: Automatic Molding Machine Co., Furane Plastics, Inc., General Plastics Corp., Industrial Research Laboratories, Avery Adhesive Label Corp., Consolidated Vacuum Division, and Filon Plastics.

Ted Walther, Pacific Coast manager of the Silicone Division of the Union Carbide and Carbon Co., moved his headquarters from San Francisco to Los Angeles on March 1. His new address is: 2770 Leonis Blvd.

Robert Johnson, president of Rubber Processing, Inc., has announced the installation of a new 3A Banbury. The new unit is now in operation and will help increase production, offering added customer service.

The 3rd Annual Southern California Industrial Safety Congress will convene on March 19-21 at the Ambassador Hotel in Los Angeles. A large exhibit of safety equipment will be displayed. Panel speakers will direct their remarks to plant foremen, supervisors and small business men.

The Los Angeles offices of H. Muehlstein & Co. have been moved to new and larger quarters at 4879 East Fruitland Ave. A new and larger warehouse is available at the new site.

F. C. "Cam" Johnston of the Caram Manufacturing Co., has been appointed to a three-year term on the TLARGI Foundation Advisory Committee, filling the expired term of Roy Phelan.

California Testing Laboratories reports the recent expansion of their organization to provide service to the industry throughout the United States. The new 5,000 square foot brick building is located at 1724 Trinity St., Los Angeles, and is fully-equipped and staffed to meet the needs of the industry for a "one-stop" technical service.

Frank E. Harper has been named plant manager of the Los Angeles plant of the B. F. Goodrich Co., succeeding J. F. Sweatt, who is retiring. J. A. Sharkey has been advanced to plant production superintendent succeeding Mr. Harper. J. Terry Taylor has been appointed manager of fuel cell operations, and David L. Haines has been named technical manager of fuel cell design and engineering.

new

The Lowest Volatility Yet . . .

THE ONLY LOW VOLATILITY PHTHALATE PLASTICIZER

with Excellent Processing Characteristics

Cabflex® HS-10

AN ALKYL ARYL PHTHALATE

A PRODUCT OF CABOT RESEARCH

Check the advantages to you of using Cabflex® HS-10 for the improvement of your vinyl plastics products:

- **Volatility 1/2 that of di-iso-decyl phthalate**
- **Requires no antioxidant**
- **Outstanding insulation resistance in electrical vinyl compounds — 13,000 megohm/1000 ft. @ 15.6°C.**
- **Excellent resistance to extraction by gasoline, oil and water**
- **Low rate of migration**
- **Greatly improves processing characteristics while maintaining the permanence of plasticizer systems in blends with polymeric plasticizers**

NOW COMMERCIALLY AVAILABLE

CABOT PLASTICS CHEMICALS DIVISION

GODFREY L. CABOT, INC.
77 Franklin St., Boston 10, Mass.

PLASTICS CHEMICALS DIVISION Dept. RA
GODFREY L. CABOT, INC., 77 FRANKLIN STREET, BOSTON 10, MASS.

☐ *Please send technical literature and free sample of Cabflex HS-10*

☐ *Yes, I would like a salesman to call*

NAME .....

TITLE .....

COMPANY .....

ADDRESS .....

.....

Canadian News

Dow Chemical Co. of the U. S. and its Canadian subsidiary, Dow Chemical of Canada, have instituted two legal actions against the Crown-owned Polymer Corp. that seek to recover a total of $18,500,000 in damages. The largest action claiming $15,000,000 is outlined in a statement of claim filed in the Exchecquer Court of Canada and lists the two Dow companies as plaintiffs and Polymer as defendant. No reply has been filed by Polymer as yet. This action charges that Polymer has infringed on patents covering methods and processes of styrene production and preservation and an invention described as distillation of polymerizable organic compounds.

This statement of claim says Dow Chemical of Canada is the sole licensee in Canada which has the right to use these patents and that Polymer has been infringing on them since October 25, 1954. It asks for an injunction restraining Polymer from further infringement and for an order directing the Crown company to return all articles made in infringement of the patents or that these articles be destroyed.

The second action involving only Dow U. S. as plaintiff with the statement of claim filed in the Supreme Court of Ontario asks for $3,500,000 damages for breach of the Canadian General Styrene Agreement, breach of trust and confidence or for conversion.

This statement of claim also seeks an injunction restraining Polymer from using technical information acquired from Dow Chemical of Canada, royalties for the use of technical information covering manufacture and production of styrene and an accounting and payment of profits made by Polymer from the use of confidential and technical information.

The statement of claim says that in October, 1942, an agreement involving Dow U. S., Dow Canada and other U. S. companies was made with Canada to provide for exchanges of technical information and patent rights covering styrene. This was designed to help Canada's war program.

Dow Chemical of Canada operated the Sarnia styrene plant as agent from May, 1942, until January, 1951. Dow used in the Sarnia plant technical information provided by the parent company under the Canadian General Styrene Agreement and its payments included royalties for the use of this information.

When Polymer Corp. took over operation of the plant in 1951, an agreement covering payment of royalties to Dow U. S. in return for a license to manufacture styrene in Canada was worked out. The statement says Dow U. S. made available all technical information which has been used since in the styrene plant.

But in July, 1954, it alleges that Polymer gave written notice that the agreement would be terminated October 24, 1954. Polymer has continued to use the technical information made available but has refused to pay any royalties despite demands that royalties be paid, the statement says.

It alleges that this is a breach of the Canadian General Styrene Agreement and has resulted in substantial damages to Dow Chemical because of loss of royalties. In addition, loss was suffered through Dow Chemical of Canada and through Polymer's operations in the U. S.

The statement notes that the technical information was provided to help Canada's war effort at a time of serious national emergency. Dow agreed to provide this information relying upon the good faith of Polymer and the Canadian Government and on the understanding that this assistance in a time of national crises would not be used later to give commercial advantages to a competitor.

The Supreme Court of Canada has unanimously upheld the legality of court injunctions emanating from anti-combines cases. The court dismissed the appeal of five rubber companies who were convicted of participating in a price-fixing combine.

Court orders were issued following convictions to restrict the companies from following practices which led to the convictions. The rubber companies which brought the test case before the Supreme Court were: Goodyear Tire & Rubber Co. of Canada Ltd.; Gutta Percha and Rubber Ltd.; and the B. F. Goodrich Rubber Co. of Canada Ltd.

The rubber companies challenged the court restraining orders arguing that the Federal Parliament, which passed laws authorizing the orders, was trespassing on grounds that belonged to the provinces under the constitution.

Mr. Justice C. H. Locke of the Supreme Court, who wrote the main judgment, said the legislation is constitutional and within the powers of Parliament. He noted that "The power of Parliament extends to legislation designed for the prevention of crime as well as to punishing crime."

He added his belief that the language of the legislation dealing with court injunctions and restraining orders appears to be a consideration of Parliament that such orders might be of use in preventing the formation of combines and "I think the matter to be wholly within its powers."

The five rubber companies were among 19 found guilty of operating an illegal price-fixing combine.

Canada Wire & Cable Co. has started construction of a factory at Winnipeg, Man., which will adjoin a plant being built by Telecables & Wires, Ltd., a subsidiary of Canada Wire, General Cable Corp. (U.S.) and Telegraph Construction and Maintenance of Britain. The two plants will cost $2,000,000 plus, of which the Canada Wire unit will represent $1,000,000. Besides its own lines, the Canada Wire plant will do custom drawing for Telecables.

W. Wallace Roff

W. Wallace Roff, executive vice-president and a director of Whittaker, Clark & Daniels, Inc., New York, N. Y., has been appointed director of Canada Talc Industries, Ltd., Toronto, Canada. This Canadian concern is the oldest and largest producer of talc in Canada, with mines and mills located at Madoc, Ont. Whittaker's Canadian distributor for these well-known talc products is the Dalex Co., Ltd., Toronto and Montreal.

The rubber footwear industry in Canada is faced with extinction in the next two or three years unless competition from Japan, Hong Kong and Czechoslovakia is checked by a change in trade policy, spokesmen for the industry said recently. Greig B. Smith, manager and secretary of the Rubber Association of Canada, told the Royal Commission on Canada's Economic Prospects that a quota system for cheap imports of rubber footwear might be the answer.

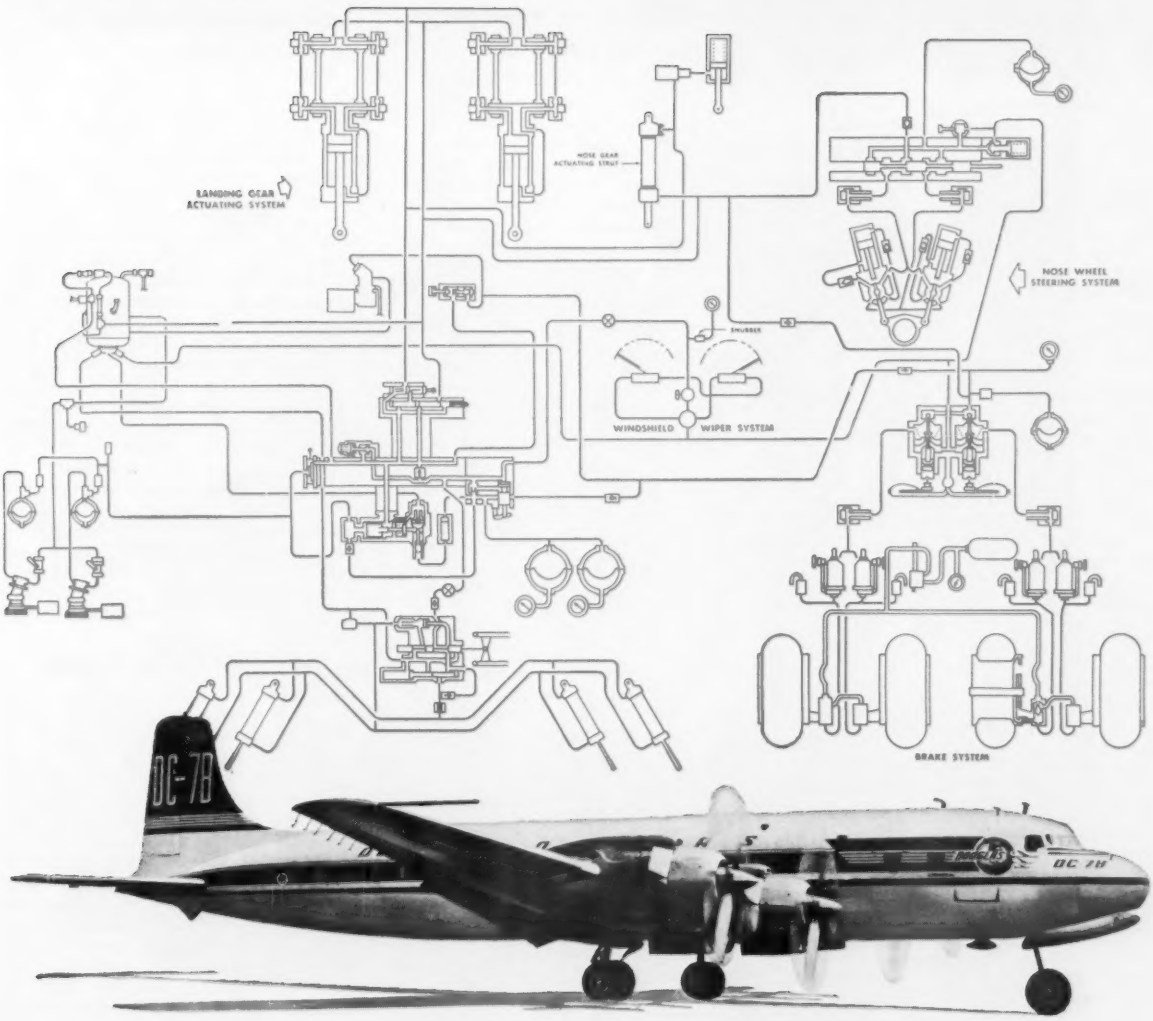
"It would be utterly ridiculous to impose a tariff rate that would permit us to survive," said Mr. Smith, who said one Canadian company already had decided to close out its manufacture of rubber footwear.

"Hong Kong footwear can be landed in Canada, duty paid, at half the cost of Canadian manufacture," Mr. Smith replied. "One can hardly envisage a 200% tariff. A quota system, based on average importation over a three-year period, might be the answer. We are not asking for a monopoly in this market. We recognize that trade must be a two-way street, but we feel that the rubber industry in Canada is bearing more than its fair share towards making it two-way."

Not only has Canada lost more than half its domestic market in rubber footwear, but it has also lost its export sales of several million pairs annually, Mr. Smith said.

The average hourly wage in manufacturing in Canada is 600% above that of Japan and 259% higher than that of Western Germany, he continued. It is not advisable for Canada to depend on foreign countries for supplies of rubber footwear, in view of the fact that the climate in this country makes rubber footwear an essential item.

R. C. Berkinshaw, president of the Goodyear Tire & Rubber Co. of Canada Ltd.,



Enjay Butyl rubber— vital artery in newest airliners

Douglas chooses Enjay Butyl for rubber components of the hydraulic systems in many of its famous DC-7 airliners. These components, which help assure the dependable operation of everything from wing flaps to landing gear, are proving over millions of air miles their durability and resistance to wear.

Versatile Enjay Butyl rubber may well have a place in *your* operation. It will pay you to investigate the many technical advantages it has over other types of rubber. Its price and ready availability are advantages, too. For full information, and for technical assistance in the uses of Enjay Butyl, contact the Enjay Company today.

ENJAY BUTYL

ENJAY *Pioneer in Petrochemicals*

ENJAY COMPANY, INC., 15 West 51st Street, New York 19, N. Y.
Other offices: Akron • Boston • Chicago • Los Angeles • Tulsa

Enjay Butyl is the super-durable rubber with *outstanding* resistance to aging • abrasion • tear • chipping • cracking • ozone and corona • chemicals • gases • heat • cold • sunlight • moisture.

said the high labor content in the manufacture of rubber footwear in Canada made this phase of the industry difficult to mechanize.

Foreign competition also is being felt in bicycle tire manufacture, the commission was told. The United States has substantially increased its export of industrial rubber products to Canada, but this situation is not nearly so serious as it is in the footwear industry.

In its brief, the association recommended an immediate and detailed study of Canadian foreign trade policy with a view to providing a favorable climate for the growth and development of secondary industry.

The association urged a government study with regard to possible changes in anti-combines legislation, asserting that the entire act, passed in 1889, should be redrafted and brought up to date. A department of economics, headed by a cabinet minister, and incorporating the Dominion Bureau of Statistics, was recommended.

Association spokesmen, in touching on the major points contained in the 96-page brief, warned that the Canadian manufacturing industry is facing all-out competition from cheap-labor nations.

The brief had this to say on the threat to the Canadian rubber manufacturing industry: "The effect of some $22,000,000 worth of rubber manufactures imported in one year into a country which already has an established rubber industry is quite another matter.

"That figure of $22,000,000 of imports of rubber manufactures represents about 8% of total apparent demand in Canada. If that percentage should keep rising, it could cause a crises in Canada's largest manufacturing industry. Many rubber companies would be adversely affected and would have to lay off employees."

Chairman Walter Gordon, when informed that tires represent approximately half the dollar value of Canadian rubber products, asked: "Are many tires coming into Canada?"

"Chiefly from the U. S.," Mr. Smith said. 'There is reason to believe that Japan is taking a deep interest in the Canadian market. What they have done with rubber footwear they might do with tires."

Mr. Smith said 5% of the Canadian consumption of tires were accounted for by U. S. imports. Cost of manufacture in Canada is about 15% higher than in the United States.

The brief said one danger to the Canadian rubber industry is that low labor cost countries can, if they so desire, install more production equipment, train workers to equal productivity and still gain the advantage of low labor cost.

Growth of the Canadian rubber industry depends on favorable economic climate, the brief declared. In addition to an anticipated high volume of tire production in the years ahead, the association expects growth to stem from such innovations as moving rubber sidewalks, rubber slabs for smoothing railway level crossings, rubber belt roads and rubberized asphalt highways.

During 1955, the Polymer Corp. of Sarnia, Ont., reached new production peaks and at the same time maintained an excellent trade position, the company states. Proposed capital expenditures in 1956 for new projects are estimated to be $5,600,000. The largest item will provide $3,000,000 to cover the initial cost of building a new butadiene unit which is required in order to expand rubber production.

Also associated with increased rubber production is approximately $1,500,000 for 1956 expenditures to improve existing production facilities at Sarnia, Ont. These improvements are concerned with unit modifications, packaging, storage and research facilities.

Outstanding commitments for projects initiated in 1955 are estimated at $4,200,000. It is planned to complete this work in 1956. "Polymer plans a continuing program of growth in order to look after Canadian needs and also hold our place in the export market," President J. D. Barrington states.

J. C. Alexander, assistant general manager of the Mechanical Goods Division, Dominion Rubber Co., Ltd., has announced the appointment of D. J. Mackenzie as general sales manager for the division. Mr. Mackenzie was formerly mechanical goods sales manager of the company's Central Division, located in Toronto. He will now be in charge of mechanical goods sales for Canada, with headquarters in Montreal. A native of Manitoba, Mr. Mackenzie joined the company in 1927. B. J. Richards becomes sales manager, mechanical goods, Central Division, replacing Mr. Mackenzie. Mr. Richards moves to Toronto from the company's offices in Winnipeg, where he was in charge of mechanical goods sales for the Manitoba-Saskatchewan Division of the company.

Henry G. Harper, vice-president in charge of sales for the Goodyear Tire & Rubber Co. of Canada, Ltd., was honored recently on his completion of 30 years of continuous service with Goodyear. Presentation of a 30-year service emblem was made by R. C. Berkinshaw, president and general manager of the company, at ceremonies held at the Toronto plant.

Want to make your opinion known? Write a letter to the editor! (See page 824).

It Still Takes Men

The word "automation" carries unhappy connotations, in the opinion of W. S. Richardson, president of the B. F. Goodrich Co. "Automation is not as automatic as the word implies," Mr. Richardson said recently. "Generally, what we consider to be automation is but the application of men's minds to improvements in our standards of living," Mr. Richardson said, adding: "Machines are conceived by men. They are built by men, directed by men, operated by men and utilized by men to better their lives."

Cyanamid Pays Anti-Trust Fine

American Cyanamid Co., New York, N. Y., has pleaded guilty in the government's anti-trust suit in which the company and other manufacturers of dry colors are defendants. A fine of $5,000 was assessed against the company; but none of the officers or employees of the company was included in the indictment. K. T. Towe, president of American Cyanamid, commented on this action as follows: "American Cyanamid Co. has had a long-established policy prohibiting and condemning price-fixing arrangements (such as were alleged in this case) which policy is based on the management's firm belief that the unparalleled success of American industry has resulted from free competition. This policy was emphatically restated in a general order to Cyanamid's entire organization, issued by the president of the company more than twelve months prior to the issuance of any subpoena relating to this case. After careful consideration of all the circumstances, the management reached the decision to plead guilty to the single count of the indictment and thereby avoid the expense and burden on its operating organization which a trial would involve."

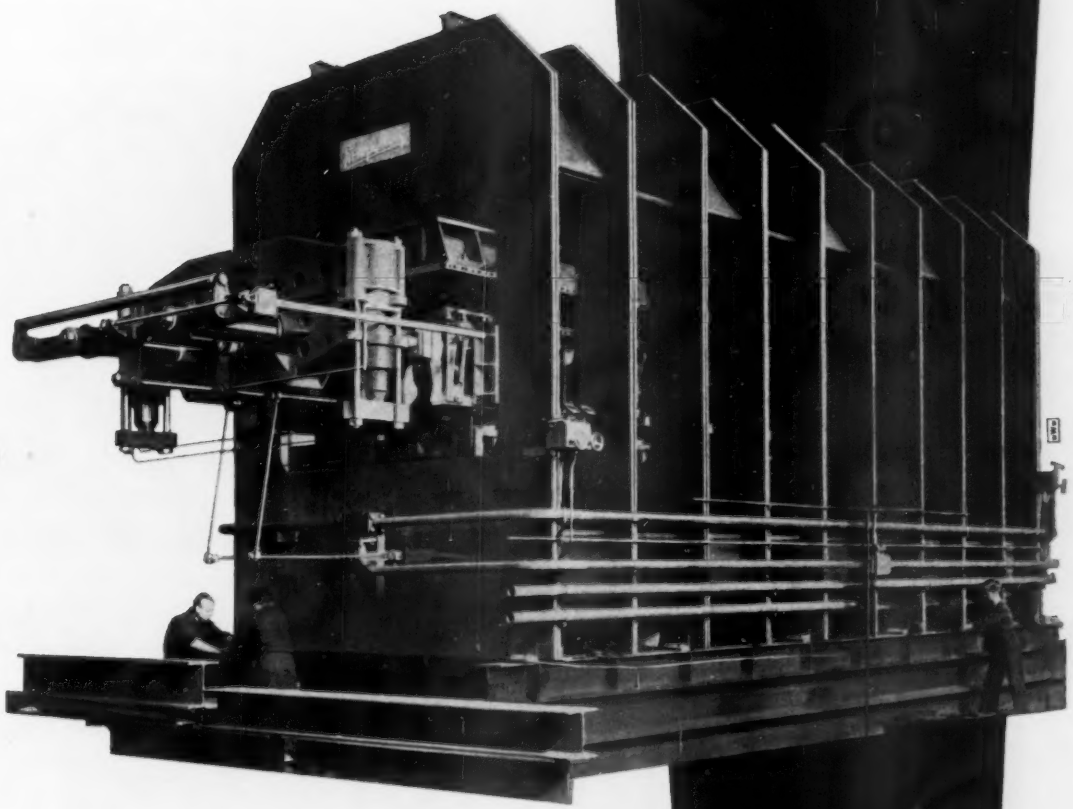
To Consider Nuclear Problems

Standards for materials and for testing of materials used in nuclear energy development, particularly in the construction of reactors, will receive special attention by the American Society for Testing Materials. A Special Administrative Committee on Nuclear Problems has been organized by the organization. Its scope is (1) to advise the technical committees of the Society on nuclear problems pertinent to their respective scopes, (2) to stimulate the undertaking of research and standardization projects, and (3) to review periodically the status of the work. As a first step in coordination, ASTM Committee E-10 on Radioactive Isotopes will be asked to expand its title and scope to investigate, promote, and advise on techniques and standards for measuring changes in properties and constitution of materials as a function of radiation exposure. The Special Administrative Committee agreed that basic procedures for specimen preparation, exposure to radiation, and special techniques for measuring properties after exposure could be developed by E-10.

Steel Blast Cleaning Grit

Wheelabrator Corp., Mishawaka, Ind., has developed a new steel grit blast cleaning abrasive called "Steeletts." The new product is available in seven sizes, from G-16 to G-120. It is particularly suited to the following applications: (1) Providing a deep etch on metallic surfaces for bonding; (2) Providing a luster on non-ferrous work by exposing virgin metal and giving it a matte-type surface; (3) Descaling alloy forgings and heat treated work, and (4) Etching steel mill rolls. Although the product has high hardness, it has long life, the company states. The particles are free from brittle carbides that cause rapid breakdown. Further information and descriptive literature are available from the company.

Siempelkamp



Hydraulic Rubber Belt Presses

Dimensions up to 10 feet wide by 50 feet long

The leading rubber factories in Europe use Siempelkamp belt presses.

All points outside U. S. A. send inquiries direct to:

G. SIEMPELKAMP & CO., KREFELD, WEST GERMANY
(Established 1883)

Telex 0853 811 Cable: Siempelkampco

REPRESENTATIVE IN U. S. A. TO RUBBER AND PLASTICS INDUSTRIES

WILLIAM TAPPER 30 SOUTH BROADWAY, YONKERS, NEW YORK

Phone: Yonkers 3-7455 Cable: Wiltapper

Obituaries

George Oenslager

Dr. George Oenslager, former chief chemist of the B. F. Goodrich Co., died of a heart attack on February 5 while aboard the Italian liner Conte Biancamano. Dr. Oenslager was going on a six-month trip abroad with his wife. He was 82 years old. Dr. Oenslager was credited with having developed for Goodrich, through his research in rubber chemistry, processes that greatly reduced the prices of and increased the life of tires and other rubber products. He developed the first nitrogenous organic accelerators. This process was

used to speed up vulcanization and made possible the use of inexpensive low grade rubbers. He was also instrumental in the introduction of carbon black as a rubber reinforcing agent.

Dr. Oenslager was born at Harrisburg, Penna., on September 25, 1873. He was graduated from Harvard University in 1894 and stayed on to earn a master's degree as assistant to Professor T. W. Richards, one of the first chemists to win a Nobel prize. From 1896 to 1905, Dr. Oenslager worked for S. D. Warren & Co. In 1905, he was hired as the first research chemist at the old Diamond Rubber Co. In 1912, Diamond Rubber was absorbed by Goodrich. He was a research chemist for Goodrich from 1912 until his retirement in 1942, except for 1920-22, when he was technical advisor to the Yokohama Rubber Co. in Japan. From 1942 until his death, Dr. Oenslager maintained his own research laboratory in Akron.

As a young man, Dr. Oenslager worked with Thomas A. Edison on problems of the use of rubber in phonograph records. In 1933, he received the Perkin Medal of the Society of the Chemical Industry. He was cited as "the American scientist who has most distinguished himself by his services in applied chemistry." The citation went on to say that as a result of Dr. Oenslager's efforts, the rubber industry has been revolutionized and from it have come manufacturing economies, increases in service and savings to consumers that run into millions of dollars annually.

In 1948, Dr. Oenslager received the Charles Goodyear Medal of the Division of Rubber Chemistry of the American Chemical Society. The citation said that his "pioneer research on the chemistry of rubber has saved millions of dollars for American motorists." Dr. Oenslager held an honorary Ph. D. degree from the University of Akron.

Dr. Oenslager was a great traveler and covered much of the world, especially since retiring in 1942. He was a former director of the Art Institute and past-president of the University Club. He was chairman of the Akron Section of the Archeological Society and was a former trustee and past-president of the Akron YMCA. Dr. Oenslager was also active in many professional and technical groups. He is survived by his wife.

Carl Davidson

Carl Davidson, former manager of training and manager of the Caribbean Division of the Goodyear Tire & Rubber Co., died on January 29 in St. Thomas Hospital, Akron, Ohio. He was 71 years old. Mr. Davidson retired from Goodyear last year after 42 years of service. He joined the company in 1912 as a general lines sales representative and was affiliated with the firm's Export Division from 1913 until his retirement. During his career, he held assignments in the Philippines, Japan, Canada, China and Java. In 1927, he was named assistant manager of the Latin American Division. In 1936, Mr. Davidson was appointed assistant manager of the Western Division. He was manager of the Caribbean Division from 1945 to 1952 when he became manager of training. He leaves his wife and three sons.

Joseph A. Baker

Joseph A. Baker, chairman of the board of Baker Perkins, Inc., Saginaw, Mich., and president of Baker Perkins, Ltd., of Toronto, Ont., Canada, died on February 21 at his home in Saginaw, Mich. Mr. Baker was widely-known in the rubber and baking machinery fields. He was 58 years old. Mr. Baker was also a director of the Century Machine Co. of Cincinnati, Ohio. He is survived by his wife and daughter.

Herbert M. Rockwell

Herbert M. Rockwell, retired sales executive of the B. F. Goodrich Co., died on January 28 in University Hospital, Cleveland, Ohio. Mr. Rockwell had spent 32 years with Goodrich when he retired in March, 1955. Most of that time was spent in sales management. After his retirement, he joined the Capitol Tire Co. of Philadelphia, Penna., and at the time of his death was sales manager. He leaves his wife and two sons.

Ernst A. Hauser

Professor Ernst A. Hauser, professor of chemical engineering at the Massachusetts Institute of Technology, and internationally-known authority on colloid science, died suddenly on February 10th at his home in Cambridge, Mass. He was 59 years old. Dr. Hauser, who was born in Vienna, Austria, and became a naturalized American citizen in 1941, was awarded the degree of doctor of philosophy by the University of Vienna and an

honorary doctorate in science by Worcester Polytechnic Institute. Following World War I service as a captain in the Austrian Army, he began his career as an assistant at the University of Goettingen, Germany. Dr. Hauser served as a research chemist from 1922 until 1925, when he was named chief chemist of the Colloid Laboratories of Metallgesellschaft. From 1932-35, he was chief chemist of the "Semperit" Austro-American Rubber Works, Ltd., in Vienna.

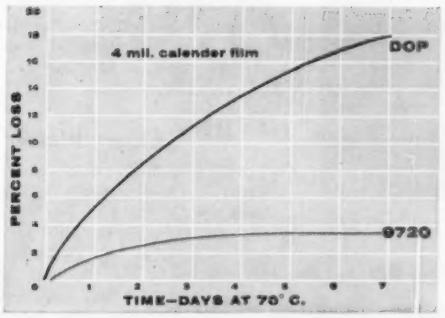
Before coming to the United States, Dr. Hauser was non-resident associate professor of colloid chemistry at M.I.T. from 1928-31. He became a resident associate professor of chemical engineering at the Institute in 1935, and a full professor in 1948. During World War II, he served as expert consultant to the Office of the Quartermaster General and as technical adviser to the Baruch synthetic rubber committee.

Author of numerous books and papers on colloids and allied chemical fields, Dr. Hauser received citations and honors from scientific societies throughout the world. He was a fellow of the American Association for the Advancement of Science, American Institute of Chemists, Institution of the Rubber Industry (London), and the New York Academy of Sciences; and a member of the American Chemical Society, National Research Council, American Institute of Chemical Engineers, Society of the Chemical Industry (London), Sigma Xi, Alpha Chi Sigma, and the Chemists Club of New York.

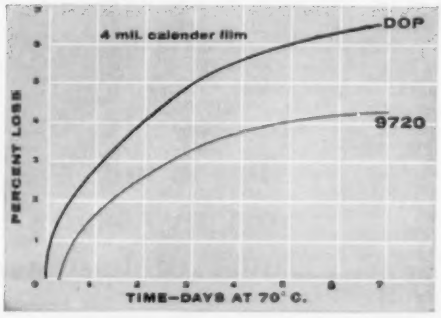
Dr. Hauser is survived by his wife, three sons, his mother and brother. Private funeral services were held at the Waterman Chapel on February 12.

OUTSTANDING

VOLATILITY

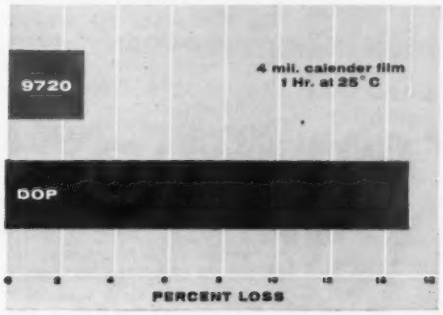


MINERAL OIL EXTRACTION

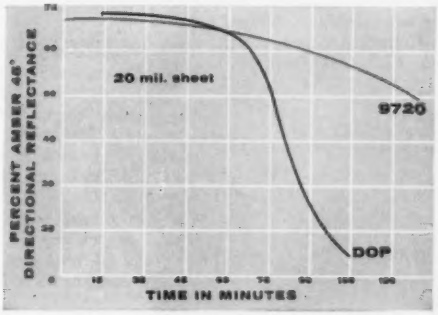


PERMANENCE

GASOLINE EXTRACTION



HEAT STABILITY



...from PLASTOLEIN® 9720, the lowest-cost polymeric plasticizer available

In giving unusual permanence to plastics, you will find that Emery Plastolein 9720 will help make a name for your sheeting and coated fabrics. It has proven its superiority by imparting the kind of outstanding durability and weatherability demanded by fabricators of finished plastic products.

Glance at the illustrated charts, and note its extremely low volatility, excellent resistance to mineral oil and gasoline extraction, superior heat stability. Equally important, Plastolein 9720 is the lowest cost polymeric type plasticizer available.

Furthermore, its lower-than-usual viscosity facilitates handling and permits bulk handling of tank car quantities.

Write today to Dept. U-3 for the complete description of all Plastolein Plasticizers.

Emery

Fatty Acids & Derivatives
Plastolein Plasticizers
Twitchell Oils, Emulsifiers

Emery Industries, Inc., Carew Tower, Cincinnati 2, Ohio

New York • Philadelphia • Lowell, Mass. • Chicago • San Francisco • Cleveland
Warehouse stocks also in St. Louis, Buffalo, Baltimore and Los Angeles

Export: 2205 Carew Tower, Cincinnati 2, Ohio

Fred W. Bommer

Fred W. Bommer, chairman of the board of the Acushnet Process Co., New Bedford, Mass., died of a heart attack on February 10 at Peter Bent Brigham Hospital in New Bedford. After graduating from the Massachusetts Institute of Technology in 1914 as a chemical engineer, Mr. Bommer joined the Boston Woven Hose and Rubber Co. as a management engineer. Later, he was employed by the Stevenson Corp., consulting industrial engineers, and through this company became associated with the Converse Shoe Co. of Malden, Mass., as plant engineer. Mr. Bommer formed the Acushnet Golf Ball Division when he joined Acushnet Process in March, 1932. He was with the firm for 24 years, becoming vice-president in charge of the Golf Ball Division and president of the Acushnet Process Sales Co., a wholly-owned subsidiary. He was elected chairman of the board of the Acushnet Process Co. last year. Mr. Bommer was a member of the Golf Ball Manufacturers Association.

Robert M. Hillas

Robert M. Hillas, chairman of the board of the Columbian Carbon Co., New York, N. Y., died on February 9 at his winter home in Belleair, Fla. He was 71 years old. After graduating from the Stevens Institute of Technology in 1908, Mr. Hillas entered the automobile business. In 1933, he was elected a board member of Columbian Carbon, and in 1948 was named board chairman. From 1938 until 1952, he served as president of the Frederick H. Levey Co., printing ink manufacturers and a subsidiary of Columbian Carbon. He was elected a member of the board of Binney & Smith, Inc., in 1933.

John G. Swanson

John G. Swanson, a leader in the plastics industry, died on January 27 at the Alexian Brothers Hospital in Elizabeth, N. J., after a brief illness. He was 68 years old. Mr. Swanson had served as an engineer in the plastics field throughout the East. At the time of his retirement two years ago, he was associated with the Hatfield Wire & Cable Division of Continental Copper and Steel Industries, Inc., Hillside, N. J. Born in Sweden, had been active in the plastics industry in the U. S. since 1913. He is survived by his wife, two daughters and a son.

A. H. Price

A. H. Price, former vice-president and treasurer of the Pennsylvania Rubber Co., Jeannette, Penna., died on February 7 at Jeannette, Penna. He was 75 years old. Mr. Price became vice-president and treasurer of Pennsylvania Rubber 43 years ago. Later, he started his own business, the Penn Pure Oil Co. Mr. Price's family was suffocated in their burning home eight years ago, when he lost his wife and two daughters. Mr. Price escaped because he had been sleeping on the porch. He belonged to various Masonic groups. Funeral services were held on February 10 in Jeannette.

Rohm & Haas Files Suit

The Resinous Products Division of the Rohm & Haas Co., Philadelphia 5, Penna., has filed a declaratory judgment suit against General Mills which asks that U. S. Patent No. 2,559,177 be declared invalid. Rohm & Haas states that the plasticizer grades of its manufacture which are allegedly involved are "Monoplex S-70," "S-71," "Paraplex G-60," "G-61" and "G-62." The Rohm & Haas action was taken in Philadelphia on February 14 in order to settle the patent question and whether the industry must pay royalties on its use of epoxy plasticizers. The complaint charges that the patent, which has been assigned to General Mills, is not valid, and is being used to injure Rohm & Haas business and that of its customers in the vinyl industry. Rohm & Haas states that during the period of litigation it will hold harmless its customers for any infringement of this patent by the use of the products noted above. This assumption of responsibility is applicable to all of these products purchased or used while the suit is pending, i.e., from February 14, 1956, until settlement is attained or the court's decision becomes final.

Albert Buys Babcock Printing

Sydney L. Albert, Akron industrialist and president of the Bellanca Aircraft Corp., has announced the purchase of the Babcock Printing Press Corp. at an undisclosed purchase price. Babcock is said to have assets of over $5,000,000. Babcock employs about 400 persons at its plant in Canton, Ohio and occupies 200,000 square feet of floor space. Mr. Albert purchased the property from John Cuneo, president of Cuneo Press of Chicago, Ill. Charles W. Ginsberg is president of the firm with John Paumier as vice-president and factory manager and Arthur Rothschild as treasurer. In addition to producing printing presses, Babcock will manufacture the new "Pulsamatic" tire press for the Albert-Harris Co. of Akron, another Albert enterprise.

Another copy of RUBBER AGE needed in your office? Use the coupon on page 983.

William R. Westfall

William R. Westfall, sales agent handling sales of industrial hose couplings for the Scovill Manufacturing Co., Waterbury, Conn., died at his home in Forest Hills, L. I., N. Y., on January 27. Born on December 29, 1894, he joined Scovill in 1929 as sales supervisor. He was subsequently promoted to division sales manager of the Merchandise Division. On December 31, 1939, he left the direct employ of Scovill to become a sales agent, handling the company's line of industrial hose couplings. Mr. Westfall is survived by his wife, a son and a daughter.

Albert Walter

Albert Walter, retired chairman of the board of the Stauffer Chemical Co., New York, N. Y., died at his home in Miami, Fla., on January 28. He began his career with Stauffer in 1906 as a mining engineer. In 1912, he became Eastern Division manager and in 1934 was named general manager. Mr. Walter was elected president of the company in 1942 and chairman of the board in 1945. He retired the following year. Following his retirement, he made his home in Miami, Fla. He is survived by his wife and daughter.

Henry E. West

Henry Eugene West, manager of contractor sales for the Anaconda Wire & Cable Co., New York, N. Y., died on February 11 at the Columbia-Presbyterian Medical Center in New York City. He was 60 years old. Mr. West came to New York last year after having been an Anaconda representative in Washington, D. C., for four years. Before that, he had been a division manager for the company throughout the South, with headquarters in New Orleans. He is survived by his wife and two sons.

George Skellerup

George Skellerup, managing director of Skellerup Industries in New Zealand, died recently while on a business trip in England. Skellerup Industries owns the controlling interest in Marathon Rubber Footwear, Ltd., in New Zealand, a Wellco-Ro-Search affiliate. Marathon Rubber is the largest footwear manufacturing enterprise in New Zealand.

Detroit Silicone Rubber Formed

Detroit Silicone Rubber Co. has been formed at 10435 Woodlawn Ave., Detroit 4, Mich., for the fabrication and processing of silicone rubber. Richard B. Marsh, formerly associated with the Dow Corning Co., has been named general manager of the new company which is affiliated with the Detroit Rubber Co., also of Detroit.

To meet the need for every manufacturer to test and demonstrate Cratex rubberized abrasives on actual deburring, smoothing and polishing operations, Cratex Mfg. Co., San Francisco, Calif., has developed a comprehensive, inexpensive polishing kit.

POLYSAR can increase the competitive values of your products.

Why? Because Polysar's quality, uniformity and customer service enable you to raise product standards and cut production costs. From a wide variety of Polysar types, you can choose the one best suited to your technical needs.

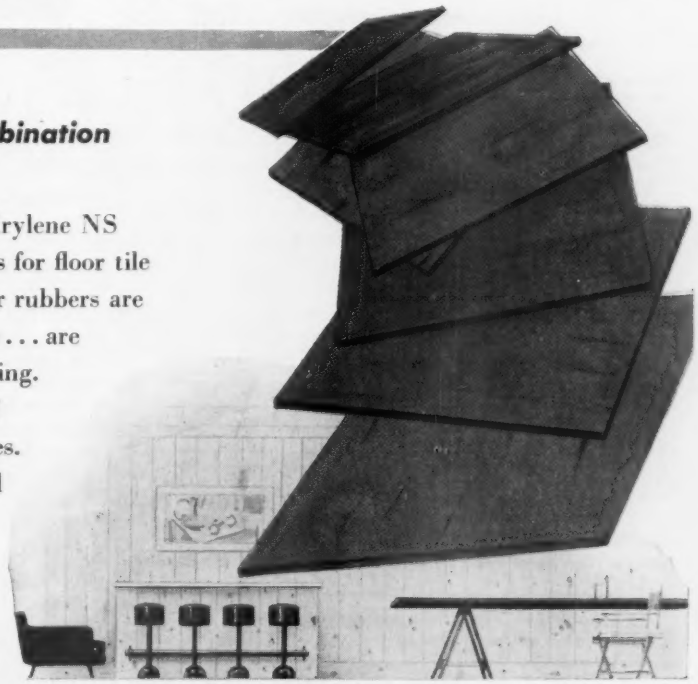
Polysar is available in the following types:

- General Purpose
- Special Purpose
- Latices
- Oil-resistant
- Butyl

For detailed information about Polysar rubbers, write to our Sales and Technical Division, Sarnia, Canada, or to our U.S.A. distributor, H. Muehlstein & Co., Inc., New York City.

Here's the POLYSAR combination for Floor Tile

Polysar SS-250 and Polysar Krylene NS together provide the ideal basis for floor tile compounds. These two Polysar rubbers are the whitest Polymers available . . . are non-staining and non-discolouring. They permit easy dispersion of pigment and short mixing cycles. Polysar rubbers have improved floor tile—they can improve your products, too.



POLYMER CORPORATION LIMITED · SARNIA CANADA
POLYSAR
REGISTERED TRADE MARK

POLYMER CORPORATION LIMITED
Sarnia • Canada
Distributors in 28 Countries Around the World

Here's your

You be the Judge!

It's up to you to decide whether *your* rubber products will be found guilty of chemical B.O. acquired during processing. It is now possible for you to treat your batches with ALAMASK® odor-masking compounds that impart clean, neutral odors to your finished products. From the table below you can select the particular ALAMASK for your application —

	Latex					Dry Rubber				Elasto-Plastics		
"ALAMASK" TYPE RECOMMENDED	Foam	Sponge	Dipped Goods	Bonded Fibers	Adhesives	Natural	Synthetic	Reclaim	Chemically Blown	Polyvinyl	Polyaryl	Plastisols
AA										X	X	X
AF					X		X		X			
AO or AO-X					X	X	X		X			
AR or AR-F			X		X							
BF or BG-X	X	X	X		X	X	X					
BGM or BGM-X	X	X		X		X						
CY					X				X			
DJ	X	X	X				X		X			
DL							X		X			
H			X		X			X	X	X	X	
LD	X	X	X	X	X	X		X				
ND or ND-X	X	X	X	X	X	X	X	X	X	X	X	
O	X	X	X	X		X	X		X	X	X	X
OS or OS-X	X	X	X	X			X					

For use in latex, the water-dispersible "ALAMASK" form is recommended. The water-dispersible forms are designated by "-X" or "-F" following the "ALAMASK" type name.

ALAMASK has no effect on processing characteristics or rate of cure... the only noticeable effect you will detect will be the upward trend of your sales curve!

NOTE

ALAMASK also abates malodors from stack fumes and plant effluents.

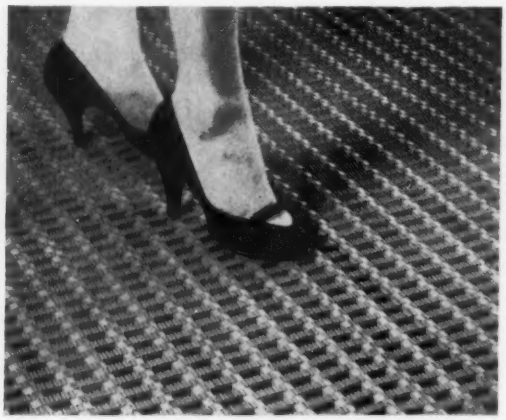
Rhodia INC. For technical data and assistance, write RHODIA, INC., 230 PARK AVE., NEW YORK 17, N. Y.

IN CANADA: NAUGATUCK CHEMICALS,
DIVISION OF DOMINION RUBBER CO., LTD.
MONTREAL • TORONTO • ELMIRA • WINNIPEG

New Goods

Goodrich Multi-Link Matting

There is no fear of catching a heel between the rubber links of a spike-heel-safe rubber matting introduced by the B. F. Goodrich Co. Industrial Products Division, Akron, Ohio. Called Multi-link" matting, each space between the individual rubber links is so small that heels cannot squeeze through and throw their wearers off balance. Yet, spacing between links is sufficient to permit proper drainage and air circulation for quick



drying. Available in red, white, gray, green and black—or in a combination of any of these two colors—the matting is recommended for use in public buildings and wherever pedestrian traffic is heavy.

The new matting is available to distributors in 50 foot rolls in widths 24, 30, 36, 48 and 60 inches. Rolls come complete with edging. Individual mats can be constructed from a roll in a matter of minutes by disengaging metal rods which connect rows of individual rubber links. (A simple tool for this operation is furnished without charge.) This action disconnects the needed matting from the rest of the roll. Nosing strips are attached to mat ends by connecting rods which hinge strips to the main multi-link structure of the mat. Nosing, in various widths, is purchased separate from rolls. Multi-link matting can also be furnished custom-made. Such features as special insignia, initials, numbers or edging to meet special problems, are built into the new mats at the factory.

Colored Neoprene Work Gloves

Recognizing the psychological value of color in all phases of life, and the preference for color in household gloves, the Surety Rubber Co. of Carrollton, Ohio, is now offering neoprene industrial gloves in an attractive red color. More pleasing to the eye, it is believed that, because of their greater visibility, they may be a factor in preventing accidents. The color also leads to better glove care, the company states, as dirt, grease, etc., show up against the red and employees are inclined to clean them more frequently. Industrial gloves in other colors may be introduced in the future if demand warrants, the concern indicates.

improves **ELONGATION**

gives lower modulus and better cut-growth resistance

PARA RESIN 2457

Para Resin 2457 is a dark-colored petroleum base resin. Its softening point, between 200-220° F, lends itself to good dispersion. It improves the flow of extrusion stocks and gives smooth calendered stocks. Because of its low specific gravity and volume cost, it is an economical compounding ingredient for mechanical goods. Tests against other resins have proven Para Resin 2457 to be far superior in every way. More and more manufacturers of mechanical goods are turning to Para Resin 2457 for improvement in product quality at lowered unit cost. Try it in your products.

Testing a free sample may save you many, many dollars. You owe it to your products to give it a trial.

The C. P. Hall Co.
CHEMICAL MANUFACTURERS

AKRON, OHIO
LOS ANGELES, CALIF.
CHICAGO, ILL.
NEWARK, N. J.

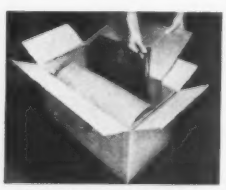
Patapar®

RELEASING PARCHMENTS

peel off easily
from pressure sensitive
and tacky surfaces

Separator for rubber tape—just the right "release" action

Ideal backing for pressure sensitive surfaces



Effective separator sheet for uncured, natural or synthetic rubbers

Releases readily from pressure sensitive plastics

Correct "releasing" action in almost any situation is provided by new *low cost* Patapar Releasing Parchments. These special types of Patapar Vegetable Parchment excel as a backing material, liner, interleaver, overwrap, separator sheet and many other uses.

Features of Patapar Releasing Parchments include: *dense, fibre free texture; high resistance to penetration or migration of oil and softeners; permanent releasing action.*

Tell us your intended application and we will gladly send testing samples and technical data.

Write today

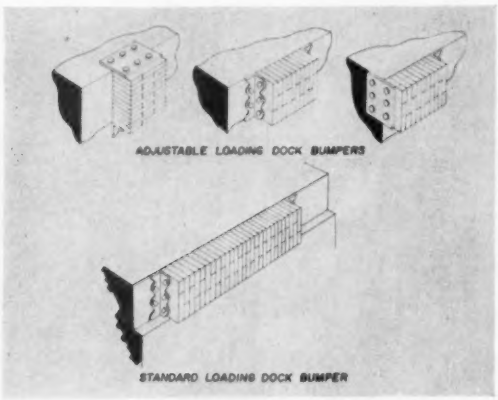
Patapar®
Vegetable Parchment
HI-WET-STRENGTH • GREASE-RESISTING

PATERSON PARCHMENT PAPER COMPANY
Bristol, Pennsylvania
Sales Offices: New York, Chicago
West Coast Plant:
Sunnyvale, California

HEADQUARTERS FOR VEGETABLE PARCHMENT SINCE 1885

Flex-O Loading Dock Bumpers

"Flex-O Loading Dock Bumpers", constructed of reversible rubber-coated fabric, and designed to minimize loading dock and truck damage and subsequent maintenance costs, are now being manufactured in three sizes by Bumpers, Inc., 2534 Detroit Ave., Cleveland 13, Ohio. The bumpers are made in four sizes in standard lengths of 14 and 36 inches, and a standard thickness of 4½ inches. They are designed to cover a facing



depth of either 6, 9 or 12 inches. A pair of the bumpers is adequate for any single dock. The company states that the specially developed rubber-coated fabric will remain resilient even when frozen; they require no additional cover. Ice will shale off the bumpers on the first slight impact.

The units have been designed with special reversible brackets which permit the user to reverse the fabric to obtain double product life. Easily assembled, the bumpers can be bolted to wooden docks, welded to steel plates or lagged to concrete facings. Two designs are available for adjustable loading docks, one with brackets at each end, the other with a bracket at one end and a plate on the other.

Agatine Floor Tile

An entirely new concept in resilient floor tile, featuring a multicolored effect derived from the gem stone agate, has been introduced by the Flooring Division of the B. F. Goodrich Co. at Watertown, Mass. The new floor covering named "Agatine", provides the quiet and comfort of rubber with a super-dense surface eliminating dirt-catching surface pores, which the company claims makes for easier cleaning. The unusual pattern, with its intricate coloring and symmetrical markings, is so arranged that hardly a fleck or a footmark shows against it, company officials state. The distinctive color effect is accomplished without the use of laminates or surface finishes. A special process makes Agatine a homogeneous material, with the many-colored, banded, agate-like structure extending throughout the full thickness. This enables the tile to resist the scuffing and scraping of the heaviest foot traffic encountered in residential, institutional, or industrial floors. Agatine is manufactured in a variety of colors in standard 9 by 9 tiles, and comes in ⅛" thickness for heavy traffic areas and in 80-gauge for lighter traffic areas.

SUN OIL COMPANY GIVES

TO THE RUBBER INDUSTRY

in

CIRCOSOL-2XH
SUNDEX-53
CIRCO LIGHT RUBBER PROCESS AID

Sun's Rubber Process Aids are known the world over for their valuable assistance to the rubber compounder.

These products are available both nationally and internationally at moderate prices.

To learn more about using Sun Rubber Process Aids to get better physicals, lower costs, and easier processing, see your Sun representative. Or write for free literature to SUN OIL COMPANY, Phila. 3, Pa., Dept. RA3.

SUNOCO®

FREE TECHNICAL BULLETINS

An Ozonator for Accelerated Testing of Rubber (Bulletin 36); A Method for Classifying Oils Used in Oil-Extended Rubbers; Circosol-2XH, Sundex-53 (Bulletin 14); Processing Natural Rubber and Synthetic Polymers; Sundex-41; Sundex-53 (Bulletin 18); Sunoco Anti-Chek (Bulletin 30).

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY PHILADELPHIA 3, PA.

IN CANADA: SUN OIL COMPANY, LTD., TORONTO AND MONTREAL

MAPICO®

Now offers 7 superior COLORS for RUBBER

REDS 297 • 347
387 • 477 • 567
TANS 15 and 20

• COLUMBIAN COLLOIDS •

All are high color iron oxide pigments of exceptional purity.

All are characterized by unusual brightness in mass tone and clarity in tints.

The reds in the order shown range from strong color on the light side to deeper red with bluer cast.

TESTS WITH NATURAL AND SYNTHETIC RUBBER HAVE SHOWN EXCELLENT AGING CHARACTERISTICS

Check these desirable points:

- Clean bright color and tint
- Easy dispersion and processing
- Color permanence
- Exceptional strength
- Unusual purity
- Fine particle size
- Good aging behavior
- Moderate reinforcement
- Tear and flex resistance
- Low "deleterious-copper" content
- Low "deleterious-manganese" content
- Controlled pH

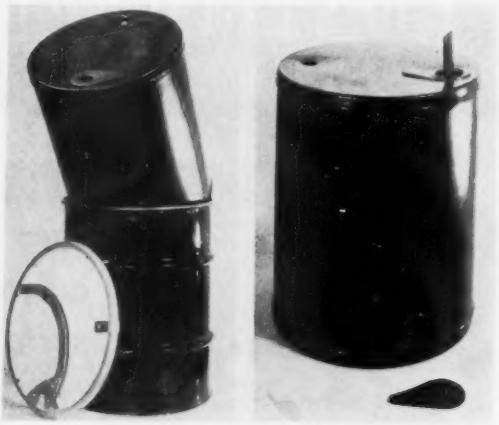
For better color and better products use these MAPICOS in:

- High quality inner tubes
- Footwear—soles, heels, uppers
- Rubber hose
- Rubber mats
- Drug items
- Sundries
- Chemical goods
- Cellular rubber

COLUMBIAN CARBON COMPANY
MAPICO COLOR DIVISION
380 MADISON AVENUE, NEW YORK 17, N. Y.

Polyethylene Drum Liner

Denver Plastics, Inc., 15200 W. Colfax Ave., Golden, Colo., has introduced a new type of drum liner weighing only 6½ pounds which keeps corrosive industrial acids from eating their way out of standard 15-gallon metal containers. The acid-resisting liner is made of Bakelite polyethylene by a new extrusion technique instead of conventional molding. Flat extruded sheets form circular top and bottom ends as well as the cylindrical



walls of this leak-tight liner. Used to ship muriatic and sulfuric acids, the non-shattering liner can be filled and emptied either inside or outside the metal drum it is made to fit (left photo). The sturdy liner stands about 19 inches high, with a diameter of about 15 inches. Pressure cap closures with wing tabs for quick opening and a pouring spout tube to eliminate spills are provided with the liner (right photo). These are also molded of Bakelite polyethylene which resists acids, caustics, oils, and most chemicals. The liner is also made in 30 and 55 gallon sizes.

Puf-foam Household Sponge

A household and industrial sponge made from a new "wearproof", polyurethane formula with variable absorption, long life, and a high degree of resistance to all household and most industrial chemicals is now being marketed by the Alpha Chemical Co. of Los Angeles, Calif., under the trade name of "Puf-foam". Made from "Stafoam", a product of the American Latex Products Corp., Hawthorne, Calif., the sponge has a high degree of absorption suitable for wiping down walls with cleaning compounds without undue drip or run-off, the distributors claim. For washing dishes, scrubbing floors, or other household or industrial chores requiring a material with high absorption qualities, the sponge may be pounded with any blunt kitchen tool to increase its absorption to the desired degree. After being subjected to six months of the most vigorous tests which included: rubbing down cement walls and continuous immersion in various acids and liquids, the sponges were found to be still pliable and usable. Puf-foam can be sterilized by boiling and is easily cleaned after use. The sponges are available in various sizes that range from the small for kitchen and other home uses to the very large for factory maintenance and other industrial needs.

USE **DCI** HEAVY CALCINED MAGNESIAS

PRECISE DCI STANDARDS PROTECT QUALITY

Controlled:
- Activity
- Fineness
- Purity

Available from conveniently located warehouse stocks, in 99% passing 325 mesh and 92% passing 200 mesh grades. Manufactured by Kaiser Aluminum & Chemical Co. For samples, data sheet and quotation, write to

DARLINGTON

CHEMICALS, Inc., 1420 Walnut St., Phila. 2, Pa.

Represented by

Summit Chemical Co., Akron • Tumpeer Chemical Co., Chicago

DPR®

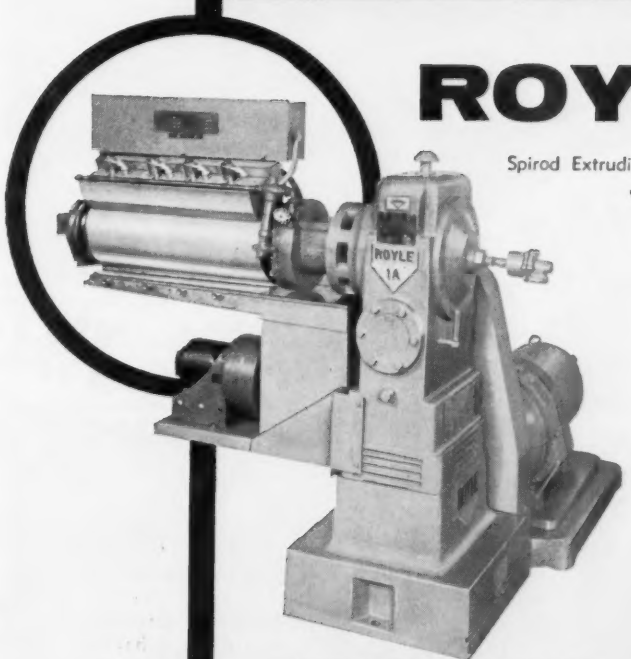
Depolymerized Rubber

AVAILABLE IN HIGH AND LOW VISCOSITIES

100% ALL RUBBER SOLIDS

DPR, INCORPORATED
A Subsidiary of H. V. HARDMAN CO.
571 CORTLANDT STREET
BELLEVILLE 9, N. J.

ROYLE 1A (2½" cylinder bore)



Spirod Extruding Machine with electric heating and high velocity evaporative cooling. An all-purpose extruding machine for processing rubber and plastics.
Available in sizes 1⅛" through 12" cylinder bore.

Strainers, Cooling Troughs, Light Wire and Cable Capstans, Motorized Take-ups, Temperature Control Units.

JOHN ROYLE & SONS ROYLE PATERSON N. J. 1880

PIONEERED THE CONTINUOUS EXTRUSION PROCESS IN

London, England — James Day (Machinery) Ltd. — Hyde Park 2430 - 0456
Home Office — V. M. Havey J. W. VanRiper — SHerwood 2-8262
Akron, Ohio — J. C. Clinefelter — SWandale 4-5020
Los Angeles, Cal. — H. M. Royal, Inc. — LOgan 3261

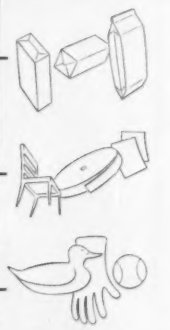
PATERSON 3, NEW JERSEY

LIKE TO CUT THE UNIT COST OF YOUR PRODUCT?

IS IT **coated?**

IS IT **heat sealed?**

IS IT **slush molded?**



THEN YOU SHOULD TALK WITH AN ARCCO ENGINEER

Unless you have talked with an ARCCO Engineer recently, you aren't up to date on the newest, most satisfactory and most economical

EMULSIONS
SOLUTIONS
HOT MELTS
PLASTISOLS

ARCCO offers you a complete compounding service. Standard ARCCO formulations cover a wide range of uses. Or, ARCCO will develop and compound modifications or special formulas tailored to your specific requirements. It will pay you to consult an ARCCO Engineer.

THE BORDEN COMPANY
CHEMICAL DIVISION
AMERICAN RESINOUS DEPARTMENT

RESIN EMULSIONS, SOLUTIONS AND HOT MELTS, FOR ADHESIVE BASES, BINDERS, COATINGS, SIZES AND SATURANTS.

103 FOSTER ST., PEABODY, MASS.

In Chicago: Resloc Dept., 3634 W. 38 St., Chicago 32, Ill.
In Canada: American Resinous Chemicals of Canada Ltd., 20 Trent St., Toronto, Canada

Accelerators in CV Vulcanization

(Continued from page 896)

of Ledate in a Bismate-Altax compound may be evidence of an interaction between the accelerators or synergism and seems to bear further investigation. As the Ledate is increased to a predominant portion of the total accelerator system, its relatively slower cure rate becomes the governing factor in vulcanization. In fact, the slightly higher water absorption figures again seem to indicate a lower degree of cure.

The mechanical water absorption figures are too high to consider this base compound an RW type, but the data are presented to demonstrate that these accelerations give moisture resistance of the same order of magnitude as for a litharge-bearing system.

Summary

With the high temperature curing systems currently being used for the continuous vulcanization of rubber-covered wire, care should be exercised in selecting those accelerators most adaptable to the process.

Investigation has shown that bismuth dimethyldithiocarbamate (Bismate) and lead dimethyl dithiocarbamate (Ledate) are of particular interest by virtue of their desirable temperature coefficients of vulcanization as measured from various stocks.

These accelerators are apparently inactive until the higher continuous vulcanization temperatures are reached and then appear to function as stable compounds rather than dissociating into a complex system of free radicals.

For the realistic evaluation of accelerators in CV compounds, equipment is required which will cure the stocks in open steam and at temperatures corresponding closely to those employed in the production equipment.

ACKNOWLEDGMENT

The authors are indebted to Messrs. Irving Gibbs and Earle H. Comstock for their technical assistance. Also, they wish to thank the R. T. Vanderbilt Company for permission to prepare and publish this paper.

LITERATURE REFERENCES

(1) Craig, D., Juve, A. E., Davidson, W. L., Semon, W.L., and Hay, D. C., "Copolymerization Theory of the Vulcanization of Rubber. VI. Hydrogen Sulfide Effects and Some Self-Limiting Features," *J. Polymer Science*, Vol. 8, No. 3, pp. 321-35 (1952); repr. in *Rubber Chem. Tech.*, Vol. 26, No. 1, pp. 57-69 (1953).

(2) Sandell, E. B., "Colorimetric Determination of Traces of Metals," Vol. III, p. 620, Interscience Publishers, Inc., New York (1950).

(3) Mellor, J. W., "A Comprehensive Treatise on Inorganic and Theoretical Chemistry," Vol. IX, Chapter L, p. 111, Longmans, Green & Co., New York (1929).

Quaker Elevated Temperature Hose

A new lightweight hose constructed entirely of synthetic materials has been developed by the Quaker Rubber Division, H. K. Porter Co., Inc., Philadelphia, Penna. The hose is the first of its type that can be used effectively at elevated temperatures in keeping jet engines heated and ready for immediate use. It is capable of handling air continuously at temperatures up to 400°F. and working pressures of 100 pounds per square inch. It can be made with inside diameters of from ¾ of an inch to 5 inches in lengths up to fifty feet.

Surface

PYROMETERS

for every purpose

The routine use of CAMBRIDGE Surface Pyrometers takes the guesswork out of temperature determination in many industries. The CAMBRIDGE is accurate, dependable, rugged, quick-acting and easy to use. The Roll Model is for checking surface temperatures of still or moving rolls. The Needle Model is for insertion into materials in a plastic or semi-plastic state for within-the-mass temperature determination. The Mold Model is for checking surface temperatures of mold cavities and surfaces of almost any contour.

Send for Bulletin 194SA.

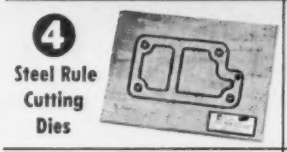
CAMBRIDGE INSTRUMENT CO., INC.
3503 Grand Central Terminal
New York 17, N. Y.

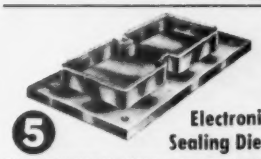
CAMBRIDGE
PIONEER MANUFACTURERS OF
PRECISION INSTRUMENTS

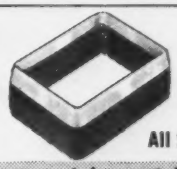
Moisture Indicators and Recorders • Physical Testing Instruments
Surface Pyrometers • Laboratory Instruments for A. C. & D. C. • Galvanometers
Engineering Instruments • Gas Analysis Equipment • Physiological Instruments
and many other Mechanical and Electrical Instruments

RUBBER FABRICATORS NEED ACCURATE CUTTING DIES

For Cutting
Rubber, Neoprene, Plastics, etc.
Sheeting, Foam, Sponge, Cellular,
Cured & Uncured
Gang Dies Our Specialty





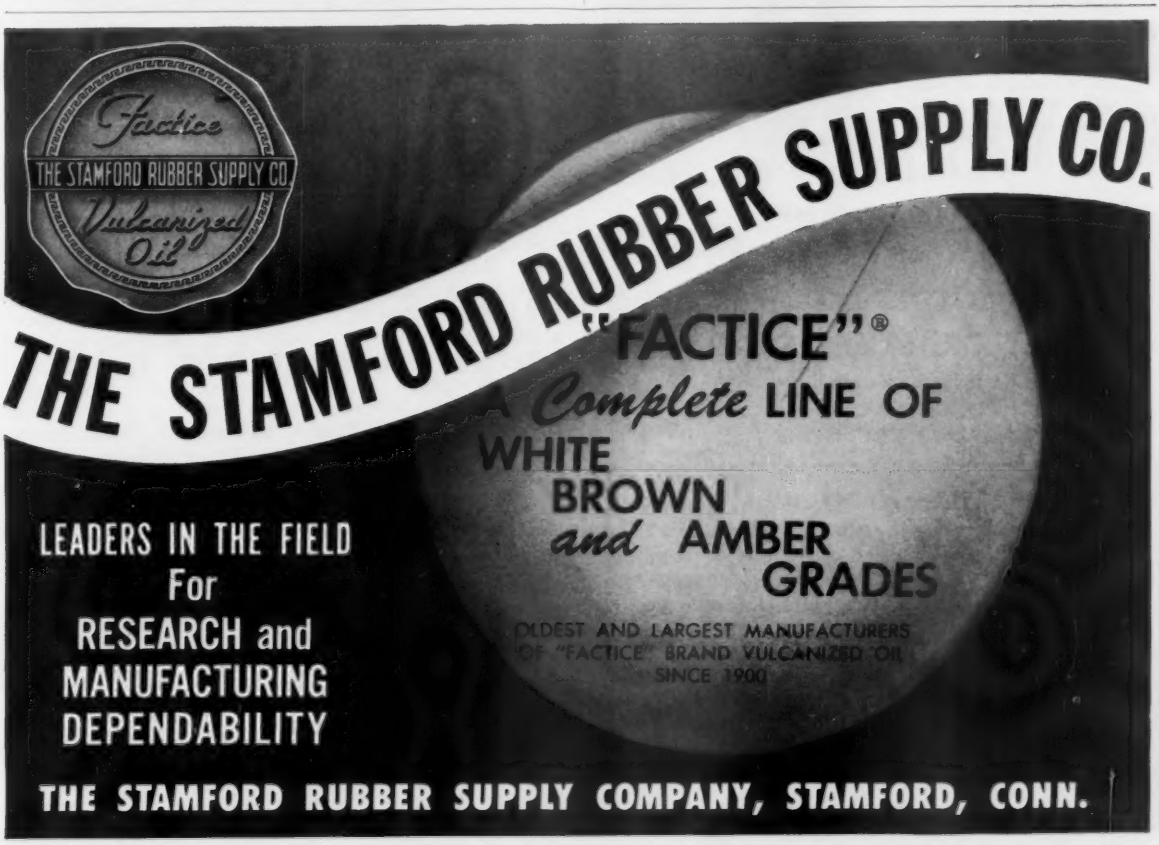


We can also die cut your materials on jobs you don't wish to handle yourself.

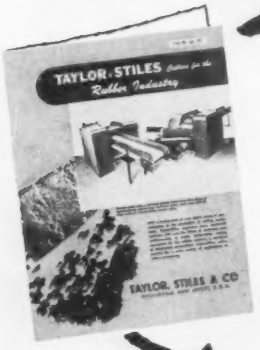
Dies for cutting gaskets, flashing from molded parts, rubber soles, foam and sponge for furniture padding, inflated toys, clothing and footwear, etc.

SAME DAY SERVICE

ACCURATE
STEEL RULE DIE MANUFACTURERS
24-28 W. 21 ST. • N. Y. 10, N. Y. • CHelsea 2-0860-1
Intelligent Service to Industry for Almost a Quarter Century

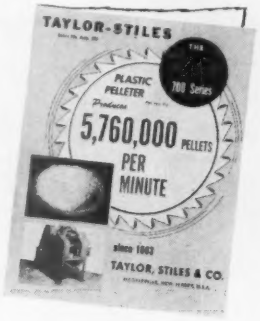


2 FOLDERS *everyone* in the Rubber Industry Should Have



Folder 202

Taylor Stiles Cutters for the rubber and plastics industry. Describes these machines and shows unique shearing action which makes for higher cutting efficiency, lower power demands and maintenance costs. Lists various types of light and heavy duty machines, and pelleters. Cites uses.



Folder 210

Taylor Stiles Plastic Pelleters. Describes various types of machines available. Illustrates the unique Taylor Stiles 700 Series Pelleter which produces a ton of pellets an hour.

Use the coupon now

to get a copy of either or both of these folders.

No obligation.

TAYLOR, STILES & CO.

216 Bridge St., Riegelsville, N. J.

Mail coupon for full details.

TAYLOR, STILES & CO.
216 Bridge Street
Riegelsville, N. J.

Please Send Me Folder —

☐ 202—Rubber and Plastics Cutters

☐ 210—Plastic Pelleters

Name .....

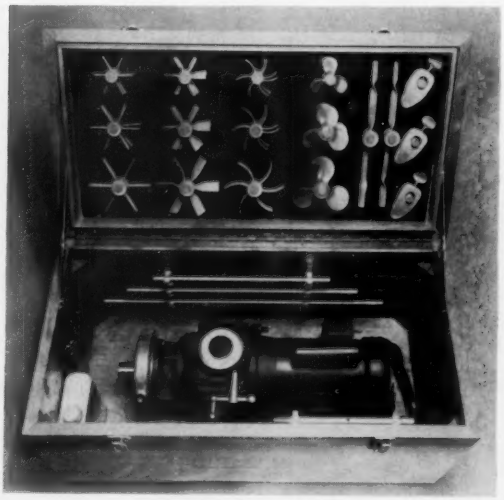
Company .....

Address .....

New Equipment

Chemineer Experimental Agitator

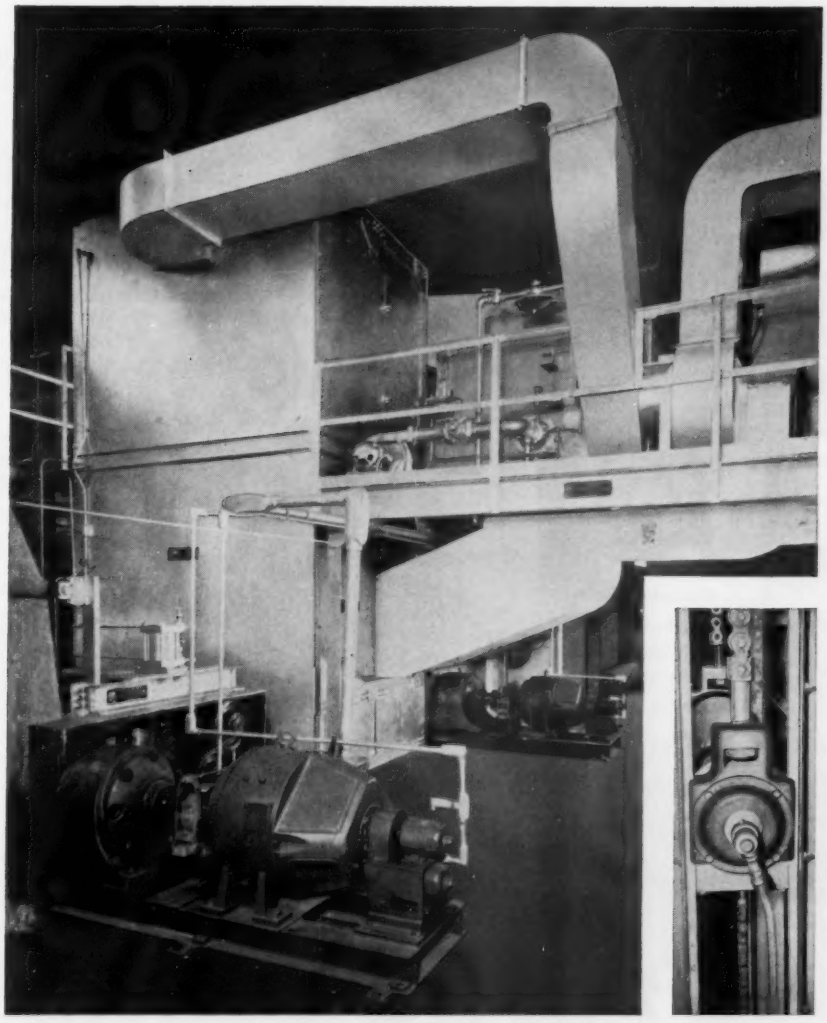
Designed for bench scale and pilot plant mixing operations, a new experimental agitator which is said to accomplish small scale fluid agitation without loss of geometric, kinematic, or dynamic similitude, has been developed by Chemineer, Inc., 1044 East First St., Dayton, Ohio. The new agitator, called the model ELB, is said to find use in three major categories: (1) Determining the agitation requirement of a specific process



operation; (2) Use as a component in a bench or pilot plant process; (3) Use in the basic study of mixing as a unit operation.

The heart of the new agitator is a specially designed drive, consisting of a constant speed motor and a variable speed transmission, with output from 0 to 1100 rpm. Micrometer control provides linear dial-speed relationship. Speed regulation under varying loads is said to be excellent. Complete calibration curves are provided with each unit. The twenty-two calibrated impellers furnished are selected to cover the full range of fluid regimes. Standard conventional turbine, propeller, and paddle styles are used and each is an accurate small scale replica of commercial impellers. Rods are ⅝-inch diameter, permitting support in laboratory ringstand clamps if desired. Three different lengths of annealed and centerless ground shafting are furnished; material is type 316 stainless steel. The shaft coupling is the rigid sleeve type, also consisting of stainless steel.

Designed to handle rubber stoppers and corks up to four inches in diameter, a new **stopper and cork borer** has been introduced by the Eberbach Corp., Ann Arbor, Mich. The new unit can be wall or table-mounted and may be used interchangeably in either a horizontal or vertical position, for the machine frame is secured in the slotted base-plate by two lock screws. A quick-acting eccentric chuck grips the individual borer and a pin device engages its slotted shank to prevent slippage. Borer shanks are ½-inch diameter for use in an electric drill.



Within the first day of startup, full width nylon tire cord processed in this 30-yard-per-minute, 14,000-pound-tension **IOI** Rollevator® Oven*, was made into aircraft tires meeting all qualification tests.

The Rollevator® roll automatically moves up and down within the oven, in direct relation to line speeds. Thus, at *any line speed, heat-exposure* time of the nylon is held *constant* at a constant temperature setting and at constant tension.

Rollevator® Oven* hot stretches nylon tire cord at constant optimum temperature, constant time and constant tension, at variable line speeds

The IOI Rollevator® Oven* is the answer to more uniform hot stretching of nylon with greater production efficiency. Simple and automatic in operation, it practically eliminates costly shutdown and repair time. When the line is stopped the Rollevator® roll automatically lowers out of the heat zone, eliminating the need for quick cool purging of the oven and the time and expense involved in reheating the oven when starting up again. Its low operating cost combined with low initial cost assures you of lower production cost. An IOI sales engineer will be glad to give you complete information about the Rollevator® Oven* and to discuss your requirements for any system from 3 to 100 yards per minute.

®Trade Mark Registered
*Pat. Applied For

INDUSTRIAL IOI ENGINEERING VERSATILITY **OVENS, INC.**

13803 TRISKETT ROAD CLEVELAND 11, OHIO

Accuracy in test results is greatly increased in the new DMC Weather-Ometer by a positive control of specimen temperatures.

A constant volume of air at a controlled temperature in the heavily insulated cabinet, maintains uniform predetermined specimen temperatures regardless of variations in room conditions.

Automatic control of humidities up to dew point is available as optional equipment.

All automatic controls including complete voltage controls are located on the front panel of the Weather-Ometer directly above the door of the test chamber.

Both horizontal and vertical testing is available. Shallow containers are used for semi-liquid materials and vertical panels for solid materials.

Source of radiation is two Atlas enclosed violet carbon arcs.

Complete technical information on the DMC model and other Weather-Ometers is contained in the new Weather-Ometer catalog. A copy will be mailed on request.

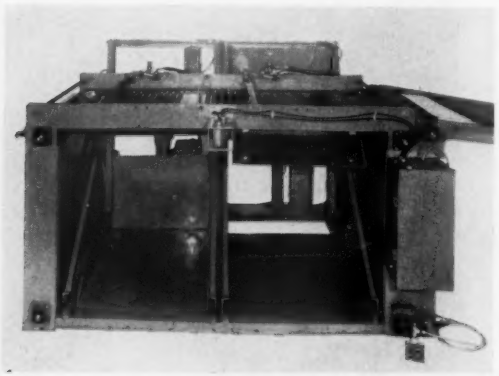
ATLAS ELECTRIC DEVICES CO.

4114 N. Ravenswood Ave., Chicago 13, Illinois

Manufacturers of accelerated testing equipment for over a quarter of a century.

Alfa Automatic Stacker

A new automatic cutter that is said to operate at speeds up to and exceeding 100 feet per minute has been developed by the Spadone Machine Co., Inc., Connecticut Ave., South Norwalk, Conn. The machine employs a simple mechanical action and accurately stacks materials for easy take-away from the production line. It is furnished as an individual unit or in combination with the Alfa rotary cutter that measures and cuts the materials



to length prior to stacking. According to the company, both units, either individually or combined, offer continuous production and are readily synchronized to the processing line. The cutting and stacking unit is fully automatic and handles a wide range of materials, including milled or calendered stock, on a continuous or intermittent basis. It is custom built to meet requirements and is furnished with single or double stacking stations as may be necessary to meet existing methods. The accompanying illustration shows a double stacker with two stations. When station number one is fully loaded, a new stack is started at station number two. When loaded, the skids are easily removed by fork truck without interrupting the stacking cycle. Lengths to be cut and stacked can be varied within a given range. Height of stack is a maximum 40 inches and load capacity is 4,000 pounds. Stacks are neat and accurate, ready for packaging or further processing.

A new double-solenoid, pilot-operated four-way valve, known as the **double-solenoid Speed King,** has been announced by the Valvair Corp., Akron, Ohio. With pilot solenoids and valve fully enclosed, the unit is said to be both moisture- and dust-proof. Built to JIC standards, the new unit requires only momentary electrical contact for operation and is capable of controlling up to 600 cycles per minute. It is available in ¼, ⅜, ½, ¾ and one-inch pipe sizes, with foot or sub-base type mounting.

A new type automatic scale which weighs sticky and non-free flowing materials as accurately as dry aggregate materials has been developed by the Richardson Scale Co., Clifton, N. J. Called a **weigh-in and weigh-out scale,** the new unit is made up of a weigher, dial scale and totalizer. Heart of the system are the electronic controls. These instruments govern the differential weighing process and the conversion of weight from analog to digital indication.

The Scope

of our Rubber Work is indicated by the following randomly selected list of projects

Investigation of the cause and cure of ozone cracking in drug sundries.

Compounding development to provide a 90 durometer vulcanizate of high plasticity during processing.

Analysis for copper, manganese and oil in a rubber bale wrapper sheet to determine the cause of tacky spots.

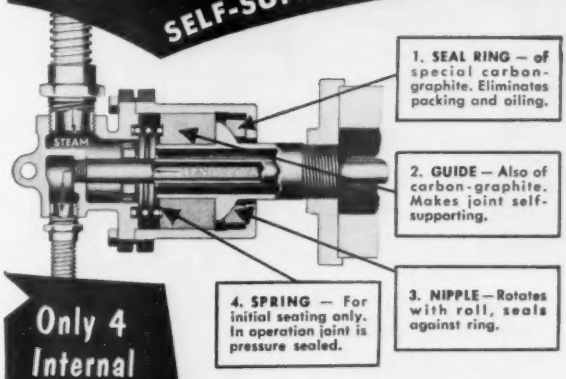
A survey of the latex rubber glove industry and the characteristics of rubber gloves to determine the likelihood of thermoplastics entering this field.

On Rubber and Plastic Research Problems we invite you to inquire without cost or obligation.

Foster D. Snell, Inc.

RESEARCH LABORATORIES
CHEMISTS • ENGINEERS
29 W. 15 St. New York 11, N. Y.
WA 4-8800

JOHNSON Rotary Pressure JOINT
SELF-SUPPORTING TYPE


STEAM
1. SEAL RING — of special carbon-graphite. Eliminates packing and oiling.
2. GUIDE — Also of carbon-graphite. Makes joint self-supporting.
3. NIPPLE — Rotates with roll, seals against ring.
4. SPRING — For initial seating only. In operation joint is pressure sealed.

Only 4 Internal Parts

For introducing steam and liquids into rotating rolls and cylinders, there's nothing like the Johnson Joint above. It's packless, self-lubricating, self-adjusting, self-supporting. It has been adopted by dozens of machinery makers, and is finding new uses every day.

Type SB shown handles both steam and condensate through same head; also available for through flow service, and in sizes and styles for all operating conditions. ***Write for literature.***

The Johnson Corporation

868 Wood St., Three Rivers, Mich.

ALCO PRODUCTS

VULCACURE*

AQUEOUS SUSPENSIONS OF ULTRA ACCELERATORS, BY A NEW PROCESS, FOR LATEX COMPOUNDING

VULCACURE ZM
50% Zinc Dimethyldithiocarbamate

VULCACURE ZE
50% Zinc Diethyldithiocarbamate

VULCACURE ZB
50% Zinc Dibutyldithiocarbamate

VULCACURE NB
47% Sodium Dibutyldithiocarbamate

PROVEN PRACTICAL AND ECONOMICAL

PARTICLE SIZE BETTER THAN FORTY-EIGHT HOUR BALL MILLED DISPERSIONS

●

Distributor for Firestone Liberian Latex

Our sales and technical staffs are at your disposal

* Registered Trademark

WEST COAST REPRESENTATIVE:
H. M. Royal, Inc.
Whse., 4814 Loma Vista Ave.
Los Angeles 58, Cal.
Phone: Logan 3261

ALCO OIL & CHEMICAL CORP.
Trenton Ave. and William St., Philadelphia 34, Pa.
PHONE: GArfield 5-0621

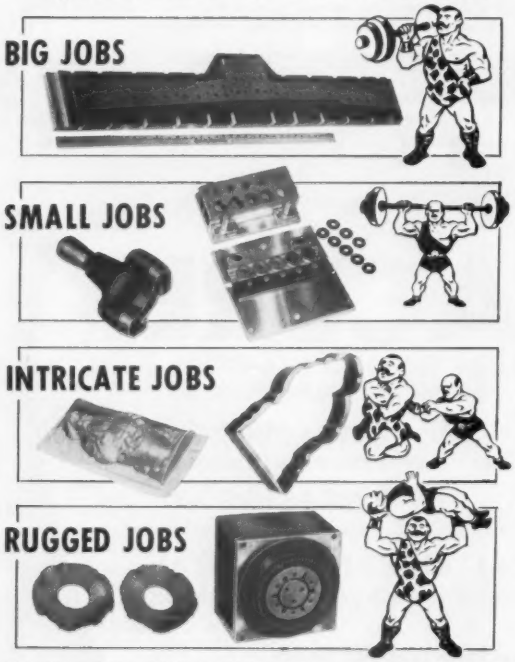
NEW ENGLAND OFFICE:
Alco Oil & Chemical Corp.
610 Industrial Trust Building
Providence 3, R. I.
Phone: Elmhurst 1-4559

THIS NEW *Free*
REFERENCE GUIDE
is Yours

It will solve many die cutting, flash trim and punching problems

Over 30 years experience—old-timer die makers and capable young engineers—modern machine shop equipment—plus only the best materials. That's what goes into every Western die and machine. Our central location enables us to quote competitively wherever your plant may be. Plastic, rubber and allied industries *"all over the world"* are using Western dies and machines.

"GO WESTERN" for a die to do the:



WE MAKE DIES FROM PATTERNS, BLUE PRINTS OR SAMPLES

FILL IN BLANK AND ATTACH TO YOUR LETTERHEAD

Please send.....FREE copies of Western's New "REFERENCE GUIDE." (Indicate how many copies desired.)

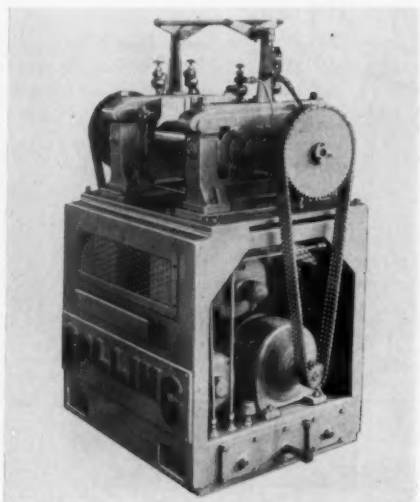
Name.....

Title.....

WESTERN SUPPLIES *Company*
2910 CASS AVE., SAINT LOUIS 6, MO.

Dual Drive Laboratory Mill

A compact 6 x 12-inch laboratory mill, with both rolls separately and infinitely variable in speed through eight to one range D.C. motors, has been introduced by Stewart Bolling & Co., Inc., 3190 East 65th St., Cleveland, Ohio. An ingenious arrangement of the motors, one operating from an inverted position, permits the dual drive mill to be mounted on a base no larger than

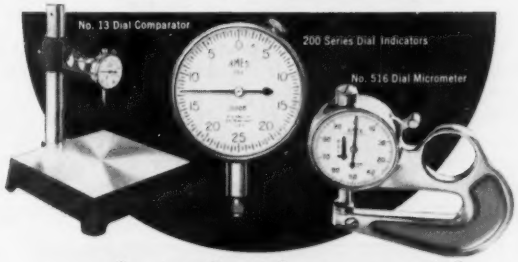


that of a conventional single motor mill. Current (D.C.) is supplied from electronic variable speed rectifiers, and no rotating M.G. sets are required. The mill has anti-friction journals full flood lubricated from a separately motorized pumping unit, which is also contained within the same base. According to the company, the mill is especially designed for laboratory uses requiring wide ranges of speeds and friction ratios, and is capable of operating continuously at extremely high temperatures.

Semimicro Dilution Viscometer

An accurate semimicro dilution viscometer developed by the National Bureau of Standards, U.S. Department of Commerce, Washington 25, D. C., promises to be of value in polymer research, where often only a small amount of polymer solution (approximately 1 ml.) may be available for molecular weight determination. The instrument, designed by Victor E. Hart of the Bureau's Polymer Structure Laboratory, differs from other semimicro viscometers in that it is suitable for dilutions and reruns of a solution. It also eliminates errors resulting from evaporation of the solvent. In the new unit, viscosity is measured in terms of the time required for a given quantity of the solution to flow through a triple-bend capillary. The device consists of two arms—vertical glass tubes about six inches long—connected by a capillary tubing system. A reservoir at the lower end of one arm contains the liquid to be studied. From the reservoir, a nearly horizontal tube leads to the capillary which, in turn, leads to a similar, nearly horizontal tube that is directly below the first. The hydrostatic head between these tubes is the driving

AMES



. . . the preferred on every job

for time-saving accuracy and dependability

Today, as for the past half century, Ames instruments are solving industry's toughest measurement problems, while providing unquestioned accuracy through millions of cycles.

We will gladly make recommendations on your measurement problems. Please send prints and specifications And ask for your free copy of the Ames catalog.

BOOTH 934
A.S.T.E.
SHOW
MARCH
19 - 23

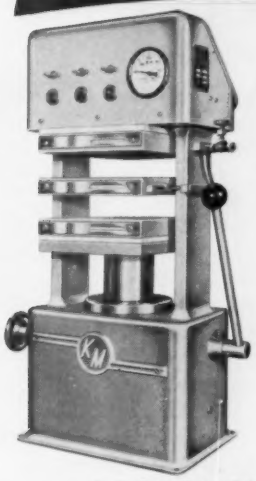
Representatives in principal cities

B.C. AMES CO.

38 Ames Street, Waltham 54, Mass.

MANUFACTURER OF MICROMETER DIAL GAUGES • MICROMETER DIAL INDICATORS

FASTER and EASIER to operate . . .



the improved

KM 20 TON HYDRAULIC PRESS

for **MOLDING**
LAMINATING
TESTING

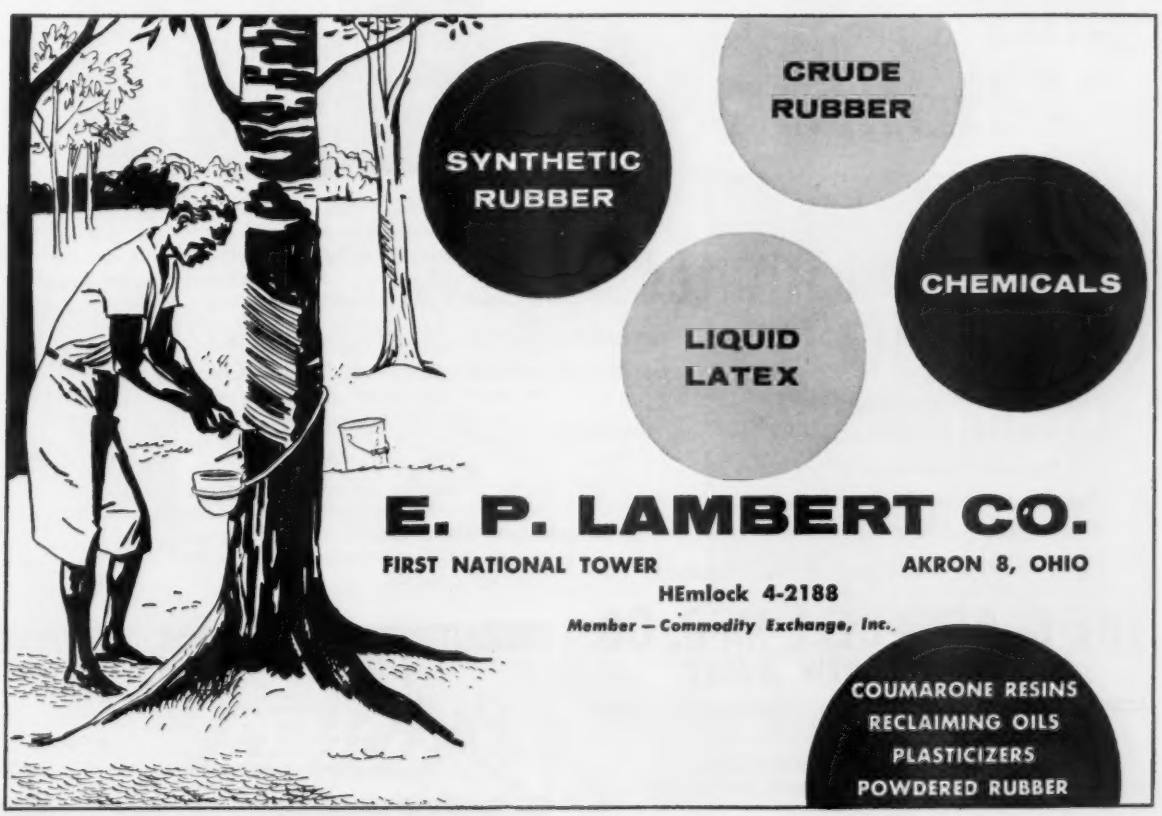
- 2, 3, & 4-platen Models (8"x8" or 9"x12")
- 2-stage High and Low Pressure Pump
- 200-600° F. Temp. Range
- Dual Voltage Platens

For complete details write:

KINGSBACHER-MURPHY CO., *Hydraulic Division*

(formerly distributors of the Preco Press)

Dept. 10 6245 Lexington Ave., Hollywood 38, Calif.



THE CARTER BELL MFG. CO.
SINCE
CARTER BELL PRODUCTS
1903
SPRINGFIELD, NEW JERSEY

Vulcanized
VEGETABLE OILS

rubber substitutes

Types, grades and blends
for every purpose, wherever
Vulcanized Vegetable Oils
can be used in production
of Rubber Goods—
be they Synthetic, Natural,
or Reclaimed.

A long established and proven product.

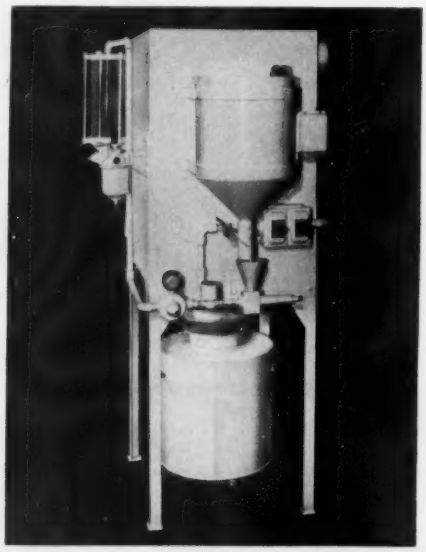
THE CARTER BELL MFG. CO.
SPRINGFIELD, NEW JERSEY

Represented by
HARWICK STANDARD CHEMICAL CO.
Akron, Boston, Chicago, Los Angeles, Trenton,
Albertville, (Ala.), Denver

pressure that forces the liquid through the capillary. Fiducial marks at each end of the lower tube are used in timing the flow of liquid through the capillary. The viscometer is attached at the center of these tubes to a vertical, rubber-encased rod.

Craig Pneumatic Duster

A new process for pneumatically dispersing and confining powdered materials for dusting, mixing and other purposes has been developed by the Craig Corp., 143 W. 20th St., New York 11, N. Y. It is said that the process does not create a health, explosion or fire hazard. The unit can be used advantageously for many dusting operations now employed in various industries, as well as processing operations where the application of dry pow-



ders of any kind, with individual particle separation, at any stage of production would serve a satisfactory purpose, be an improvement, or supplant present methods.

Powdered material is aerated and dispersed with individual particle separation to create, maintain and confine a cloud of powder laden air of proper density without floculation or fluctuation at a point of use. There is no flotation in the atmosphere. Cleanliness, economy, and an improvement of quality is assured. Equipment of proper size can be constructed to handle any volume of powdered material required for a specific use. It is compact, requiring very little floor space. Not being pressure tight, it can be loaded while in operation, without the loss of production or down-time. Talcs, starches, sugars, flours, clays, stearates, micas, metals, resins and pigments are some of the powdered materials that can be handled satisfactorily.

SINCE 1880 RUBBER GOODS
"They Last Longer"
REG. U. S. PAT. OFF.
Rand.
REG. U. S. PAT. OFF.
DRESS SHIELDS
DRESS SHIELD LININGS
BABY PANTS
BABY BIBS & APRONS
SANITARY WEAR
RUBBERIZED SHEETING
RUBBER APRONS
STOCKINET SHEETS
RUBBER SHEETS
RAINCAPES & COATS
RUBBER SPECIALTIES
VINYL PLASTIC SHEETING
RUBBER DAM & BANDAGES — SHEET GUM
RAND RUBBER CO. BROOKLYN, N. Y. U. S. A. MFRS.

UTILITY FAN OR V-BELT COVERING
MACHINE FOR VARIOUS SIZES
AND CROSS-SECTION BELT

UTILITY MANUFACTURING COMPANY

Cudahy, Wisconsin

Cable Address: UTILITY-MILWAUKEE

Long Distance Phone Call

MILWAUKEE—SHERIDAN 4-7020

Hard, flexible rubber with

POLYPOL S-70

Because low modulus, high elongation and high hardness are inherent characteristics of POLYPOL S-70, this coprecipitate of lignin and a butadiene-styrene copolymer provides:

HIGH HARDNESS while maintaining A HIGH DEGREE OF FLEXIBILITY

Good color properties when used with light-colored pigments, plus high tear resistance, are also characteristic.

Send for working samples and technical bulletins of the 200 series.

Polychemicals DIVISION

West Virginia Pulp and Paper Company

CHARLESTON A, SOUTH CAROLINA

PRESSES . . .

FROM THE SMALLEST TO THE LARGEST

LABORATORY PRESSES

STANDARD and CUSTOM BUILT HYDRAULIC PRESSES for . . .

RUBBER • PLASTICS • METAL WORKING
REINFORCED FIBER GLASS MOLDING

EEMCO builds every size hydraulic press from laboratory sizes up to the largest sizes—for any production requirement. A complete line of standard units is also available. Without obligation ask us to quote on your needs.

LAMINATING PRESSES • SPECIAL PRESSES

EEMCO

ERIE ENGINE & MFG. CO.
12th ST. & EAST AVE., ERIE, PA.

investigate these
Burgess
COMPOUNDING MATERIALS
for Rubber and Synthetic
Resin Compounds!

USE BURGESS "ICEBERG" PIGMENT

- **For Vinyl Extrusion and Vinyl Floor Covering Compounds** "Iceberg" provides excellent base color as a white mineral loading, excellent resistance to alkalis and acids, high specific resistance with low moisture absorption properties.
- **For Butyl Wire and Insulating Compounds** "Iceberg" possesses excellent processing, reinforcing, and good electrical properties.
- **For Colored Butyl Inner Tubes, Drug Sundries and Mechanical Goods** "Iceberg" possesses excellent color, processing and curing properties and low moisture absorption.
- **For GR-S Compounding** "Iceberg" is useful in compounds requiring good white filler with good processing properties, i.e., "Iceberg" prevents stickiness on the mill and also prevents die-plating of extrusion compounds.

USE BURGESS "ICEBERG K" PIGMENT

- **For Superior Results**—when finer particle size and reduced screen residue are desirable.

USE BURGESS "PIGMENT NO. 30"

- **For Vinyl Insulating and Electrical Compounds** No. 30 possesses excellent color and yields high insulation resistance values.
- **For GR-S Compounds** No. 30 acts as a good reinforcing agent and filler with a high degree of uniformity with respect to specific resistance, low moisture absorption, good color and brightness.

USE BURGESS "PIGMENT NO. 20"

- **For Natural and Synthetic Rubber Compounds** No. 20 yields level cures because of controlled pH.
- **For Rubber Footwear Compounds** No. 20 possesses excellent reinforcing characteristics and good color.

Write for technical data, working samples, and prices.

Burgess Pigment COMPANY
Mines and Plants: Sandersville, Georgia
• HYDROUS AND ANHYDROUS ALUMINUM SILICATE PIGMENTS
• KAOLIN CLAYS

Reviews

BOOKS

Proceedings of the Third Rubber Technology Conference: 1954. Edited by T. H. Messenger. Published by W. Heffer & Sons, Ltd., Cambridge, England. Available in the United States from RUBBER AGE, 101 W. 31st St., New York 1, N. Y. 7¼ x 9¾ in. 844 pp. $13.50.

The Third Rubber Technology Conference, under the auspices of the Institution of the Rubber Industry, was held in London, England, on June 22-25, 1954. Fifty papers were presented, all of which are now published in this volume. The conference maintained its international character, 19 countries being represented and 784 members registering, an increase of 120 over the 1948 membership. That the conference was a success is shown by the fact that, since its close, the Institution has decided to hold a Fourth Conference in 1959 and to give it the necessary financial support.

In the Third Conference a study of fundamentals was notable. Molecular structure, physical structure, high polymer chemistry, the nature of chemical reactions in rubber, and the nature of reinforcement figured prominently. Since a review of the various papers would be too lengthy and involved, we are listing below the titles and authors by conference subject:

Properties of Natural Rubber Latex: "Micro-Gel in Latex and Sheet Rubber," by R. Freeman; "Improved Rubbers by the Enzymatic Deproteinization of Skim Latex," by J. E. Morris; "Stability of Ammoniated Latex and Soap-Stabilized Emulsions in the Presence of Complex Zinc Salts," by T. S. McRoberts; "Variability of Hevea Latex," by W. L. Resing; "Zinc Oxide Testing of Latex," by E. W. Madge, H. M. Collier, and J. L. M. Newnham; "Hevea Latex: Its Structure and Viscosity," by G. Verhaar; "Contribution to the Study of Mineral Elements in Field Latex," by E. R. Beaufils; "Rubber Peptized on the Plantation," by G. Giger, J. Lemee, and M. Liponski.

Production and Evaluation of Synthetic Rubber: "Cation and Anion Influence in the Alfin Reagent for the Polymerization of Butadiene," by A. A. Morton, I. Nelidow, and E. Schoenberg; "Evaluation of Synthetic Rubbers and Latices," by I. D. Patterson; "Recent Studies on the Structure of Synthetic Rubber," by R. F. Dunbrook, B. L. Johnson, J. L. Binder, J. M. Willis, and E. L. Carr; "Rubbery Copolymers from Unsaturated Ketones," by W. Cooper, T. B. Bird, and E. Catterall; "Preparation and Properties of Condensation Block Copolymers," by D. H. Coffey and T. J. Meyrick; "Graft Polymers Derived from Natural Rubber," by G. F. Bloomfield, F. M. Merrett, F. J. Popham, and P. McL. Swift; "Oil Resistance of Synthetic Rubbers Over Very Long Periods of Time," by B. Sarno; "Structure and Solution Properties of High Molecular Weight Butadiene-Styrene Copolymers," by R. B. MacFarlane and L. A. McLeod; "Pyridinium High Polymers," by W. B. Reynolds, J. E. Pritchard, M. H. Opheim, and G. Kraus.

Chemistry of Rubber: "Studies in Latex Particle Reactions: Kinetics of Hydrochlorination of Unvulcanized and Vulcanized Latices," by M. Gordon and J. S. Taylor; "Oxygen-Absorption Effects in Cured and Uncured Natural Rubber," by R. L. Stafford; "Infra-Red Spectroscopic Analysis of Elastomers," by W. H. T. Davison and G. R. Bates; "Structural Characteristics of the Sulfur Linkage in Natural Rubber Vulcanizates," by L. C. Bateman, R. W. Glazebrook, C. G. Moore, and R. W. Saville; "Chemical Reactions of Antioxidants Used in Vulcanized Rubber," by P. Schneider; "Cross-Linking and Radiation Effects in Some Natural and Synthetic Rubbers," by A. Charlesby and D. Groves.

Physics of Rubber: "Modification of the Permeability of Natural Rubber Vulcanizates," by P. Thirion; "Reinforcement and Tear Strength Anisotropy," by H. J. J. Janssen; "Elasticity of Ideal and Real Rubberlike Materials," by H. M. James and E. Guth; "Study of Rubberlike Polymers by Nuclear Magnetism," by B. A. Mrowca and E. Guth; "Natural Rubber Compounds for Intermittent Low Temperature Service," by W. P. Fletcher, A. N. Gent, and R. I. Wood; "Theoretical Model for the Elastic

VINYL TIRE PARTS TUBES

Woloch for RUBBER

SCRAP · CRUDE
ALLIED MATERIALS

george Woloch CO., INC.

601 West 26th Street, New York 1, N. Y.

Phone: ORegon 5-2350
CABLE
GEOWOLOCH — New York

OFFICES AND WAREHOUSES

CUYAHOGA FALLS, OHIO
1587 Water St.
Phone: SWandale 4-5237

JERSEY CITY, N. J.
432 First St.
Phone: OLdfield 6-6513

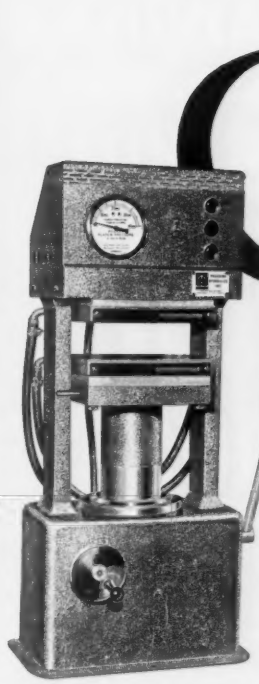
LONDON, ENGLAND
Curtis Woloch Co. Ltd.
58 Bow Road, London E. 3
Phone: ADvane 5411

NEW YORK, N. Y.
601 West 26th St.
Phone: ORegon 5-2350

CRUDE RUBBER FOAM RUBBER SYNTHETIC RUBBER

UNCURED FRICTION COMPOUNDS CAMEL BACK ENDS

TIRES POLYETHYLENE BUFFINGS



This mark identifies the finest bench presses ever made. If you need a hydraulic bench press, write for circular or if you prefer we'll have our nearest representative call on you...

PHI PRESS
formerly Preco

Pasadena Hydraulics, Inc., 273 No. Hill Ave., Pasadena, Calif.

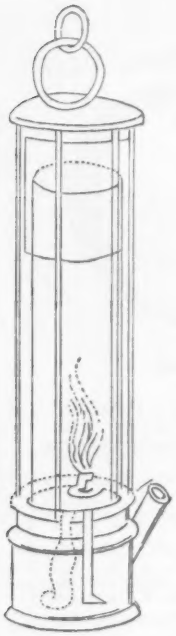
Manufacturers of CANARY LINERS

Mildew-proofing *and* Flame-proofing Cotton Fabrics as per Government Specifications. *Write or Wire for Samples and Quotations.*

EXPORT AGENT
Binney & Smith, International, Inc.,
380 Madison Ave., New York 17, N. Y.

CANADIAN AGENT
Columbian Carbon (Canada) Ltd.,
33 Edward St., Toronto 3, Ontario, Canada

J. J. WHITE Products Co.
7000 UNION AVENUE
CLEVELAND 5 OHIO



Important dates in the History of Industrial Progress

1816

In mining . . .

Sir Humphrey Davy invented the miner's safety lamp, greatly lessening hazard. Fewer mine disasters meant more coal for Britain's infant industries.

In the history of fats and waxes

Chevreul prepared stearic acid in 1816. In 1837, A. Gross & Company entered the infant fatty acid field and has since pioneered in the improvement of production techniques and products. A. Gross' Hydrogenated Rubber Grade Stearic Acid, for example, has been developed for incorporation into rubber compounds which require a low priced fatty acid of uniform quality.

Send for samples and catalog "Fatty Acids in Modern Industry."

HYDROGENATED RUBBER GRADE STEARIC ACID

Titre	55°C. min.
Titre	131°F. min.
Color 1" Lovibond Red	8 max.
Color 1" Lovibond Yellow	50 max.
Saponification Value	198 min.
Acid Value	190 min.
Iodine Value	13 max.

A. GROSS & COMPANY

295 Madison Avenue, New York 17, N. Y.

Factory: Newark, N. J. Distributors in Principal Cities

Manufacturers Since 1837

Behavior of Filler-Reinforced Vulcanized Rubbers," by L. Mullins and N. R. Tobin; "Non-Linearity in the Dynamic Properties of Rubber," by A. R. Payne.

Developments in Testing Methods: "Tear-Down Adhesion Testing," by B. Pickup; "Constant Power Principle in Abrasion Testing," by E. F. Powell and S. W. Gough; "Changes of Electrical Resistance of Rubbers Loaded with Carbon Black," by D. G. Marshall; "Tire Cord Fatigue and Fatigue Testing," by R. S. Goy; "Pneumatic Tire Testing," by J. I. S. Williams and R. G. Clifton; "Fast, Easy Test for Measuring Relative State of Cure," by L. R. Sperberg.

Compounding: Theory and Practice: "Nature of 'Chemisorptive' Mechanisms in Rubber Reinforcement," by V. A. Garten and G. K. Sutherland; "Interaction of Rubber and Fillers During Cold Milling," by W. F. Watson; "Role of Intermediate Level Carbon Blacks in Rubber," by I. Drogin; "Role of Particle Diameter and Linkage Formation in Rubber Reinforcement," by A. F. Blanchard; "Lignin as a Compounding Ingredient for Natural Rubber," by I. Sagajllo; "Mooney Viscosity of Carbon Black-Rubber Mixtures," by M. Studebaker; "Oil Extension of Natural Rubber," by G. J. van Amerongen and H. C. J. de Decker; "Behavior of Highly-Filled Rubber Vulcanizates," by K. C. Bryant and D. C. Bissett; "Rubber Reinforcement by Resins Formed in Latex," by J. van Alphen.

Miscellaneous Technology: "Abraded Filament Tire Cord," by E. R. Gardner, A. E. Herbert, and W. C. Wake; "Effect of Heat Setting on the Physical Properties of 'Terylene' Polyester Fiber," by D. N. Marvin and T. J. Meyrick; "Time Dependent Effects in Tire Cords," by J. O. Wood and W. F. Kilby; "Wave Phenomena in Tires at High Speed," by D. M. Turner; "Tread Wear and Fuel Consumption of Tires," by H. C. J. de Decker, R. Houwink, and G. J. van Amerongen.

The volume also includes author and subject indexes as well as brief reference to various social functions. Exhibits at the conference are classified and arranged in twelve groups. The organizations responsible for the development and manufacture of the instruments are indicated. Where instruments have been described in patents or in the literature, some references are given.

•

Automatic Process Control for Chemical Engineers. By Norman H. Ceaglske. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 6 x 9 in. 284 pp. $6.75.

This is the first book to present and apply the basic mathematical principles of process control in an elementary form. It is written directly for the chemical engineer—on the theory that chemical engineers cannot have a fully rounded knowledge of their profession unless they are familiar with the fundamentals of automatic control. The author has developed this book from a course taught to his own undergraduate students at the University of Minnesota.

The examples and illustrations in the text have been included for the purpose of showing the use of equations rather than specific practical applications. The same purpose is served by a variety of typical problems at the end of each chapter. The first chapter of the book is an introduction and includes a very brief history of automatic control. Chapter two is entirely descriptive, first covering briefly the action of each part of the control system and then the action of the complete control system. Its purpose is to acquaint the reader with the general problem and the terminology before embarking upon the mathematical phase of the specific problem.

The remainder of the book is divided into five parts, each of which covers a specific phase of the mathematical analysis. One chapter is devoted to the derivation of all the equations needed in the analysis of control systems. Included in this chapter is an introduction to the Laplace transformation. Other chapters treat with such items as transient analysis of control systems, frequency response of control systems, and the analysis of simple control systems.

WANT THE RIGHT TALC?

Call on Whittaker

"The Talc House"

"MARINE" MAGNESIUM OXIDE
(Maglite M)

•

VALENCIA PUMICE

•

ELK BRAND ANTIMONY OXIDE

WHITTAKER CLARK & DANIELS, INC.

260 West Broadway
New York 13, N. Y.

NATIONAL FORGE
Compression - Crush
TESTING MACHINES

For Rubber and Cushioning Materials

- Dual Loading Range 0-100 lbs. — 0-1000 lbs. A.S.T.M. Accuracy.
- Simple, permanently accurate mechanical weighing.
- Large, easy-to-read eye-level scale.
- Infinitely-variable speed.
- Improved Recorder, flat stress-strain graph. Start at any preload.

Ask for Bulletin 550

LARGER MACHINES OF 5000 and 10,000-lbs. AVAILABLE
Ask for Bulletin 551

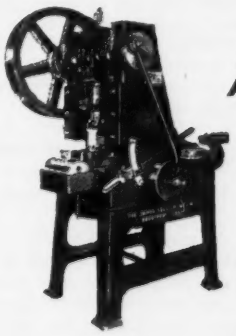
TESTING MACHINE DIVISION

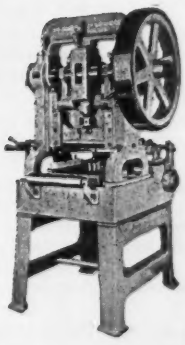
NATIONAL FORGE AND ORDNANCE CO.

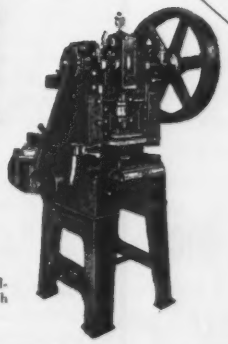
Dept. R.A. Irvine, Warren County, Penna.

for **60** *Productive Years*

COULTER
CUTTING MACHINES







have meant quality, economy and dependability. Now, backed by this period of manufacturing know-how and service, COULTER sets the pace for another 60 years of even greater quality, economy, dependability.

MODEL A1 ▲
Precision cutting for both high-speed production or short runs.

MODEL A2 ▶
Precision cutting for multiple heels, half and full soles with stock grain.

MODEL A2s
(not illustrated)
Precision cutting across grain of stock.

MODEL A3 ▶
Precision cutting of multiple heels and taps with or across stock grain.

* *Since 1896*

COULTER — FOR CUTTING

WRITE FOR ADDITIONAL INFORMATION

the James COULTER Machine Co.
BRIDGEPORT, CONN.

BRIDGEPORT CONNECTICUT

Rolled steel frame from solid plates provides extreme rigidity and strength.

Patent Pending

NOW THE FIRST REAL IMPROVEMENT IN HYDRAULIC PRESSES IN FIFTY YEARS

New Custom Multiframe Hydraulic Presses

Completely new, in design and construction, streamlined Custom Multiframe Hydraulic Presses offer revolutionary improvements over conventional units. These modern presses offer you:

1. Any size platen, any diameter ram—any capacity.
2. All-steel construction—no castings.
3. Designed for any pressure required.
4. High strength with liberal safety factor.
5. Multiframe construction places load directly on ram—eliminates deflection.
6. Heavy steel frames of press provide extra strength.
7. Five-year guarantee.
8. Reasonably priced.
9. Prompt delivery.

Phone or write for quotation to your exact specifications on hydraulic presses for any purpose.

Custom Machine & Design, Inc.

P.O. Box 1064 Telephone HEmlock 4-9141

200 South Forge St. Akron 9, Ohio

EXCLUSIVE SALES AGENTS—AKRON RUBBER MACHINERY CO., INC.

BOOKLETS, CATALOGS, etc.

Classes and Properties of Compounding Materials for Use in Elastomers. By Dr. I. Drogin. United Carbon Co., Inc., Charleston 27, West Va. 8½ x 11 in. 48 pp.

This publication is a reprint of a lecture delivered by Dr. Drogin at the New York Rubber Group's Elastomer Technology Course. It classifies the more important available compounding materials and describes their properties and functions. Using tables to group the materials, the author discusses the composition of a rubber compound relative to the selection of such materials as elastomer, peptizer, vulcanizing agent, accelerator, filler and plasticizer. The many grades of carbon blacks have been grouped in this lecture under 16 types which take cognizance of particle fineness, electrical conductivity, processing and extrusion features, as well as the degree of reinforcement as exemplified by stress-strain and resistance to abrasion. In addition to carbon blacks the author also discusses in detail organic non-black reinforcing materials, organic loading materials, extenders, diluents, softeners, processing aids, plasticizers, protective materials and miscellaneous groups of compounding materials.

•

Vyram: Solvent Resistant Elastomer. (Technical Bulletin ODB 55-21). Monsanto Chemical Co., Nitro, West Va. 8¼ x 10¾ in. 32 pp.

Vyram, a new solvent-resistant acrylate elastomer under development by Monsanto shows considerable promise according to the company, but many questions concerning its compounding and end uses are yet to be answered. This technical bulletin presents and summarizes data from numerous tests on the material. Outlined in tabular form is a summary of properties for eight compounds based on metallic oxide and amine curing systems. The results of such tests as hardness, 300% modulus, tensile strength, compression set, tear strength, low temperature flexibility, and Gehman low temperature torsion test are included. General compounding information is offered as well as data on processing. Also presented is information recently obtained on several polyblends of the material and such elastomers as Butyl, Hycar 1001, Hycar PA-21, and Neoprene WRT. In addition, immersion data is given for the material in various oils and solvents.

•

Lytrons: Synthetic Polyelectrolyte Thickeners for Latex and Other Aqueous Dispersion Systems. (Bulletin No. 1005). Monsanto Chemical Co., Plastics Division, Springfield, Mass. 8½ x 11 in. 32 pp.

Discussed in this bulletin are the thickening properties of seven of the company's polyelectrolytes. These materials are synthetic thickening agents which are suggested as replacements for natural thickeners in a broad range of industrial applications. Five are in the company's Lytron series while two others are supplied under the Lustrex trademark. Covered in separate chapters are chemical and physical properties, the preparation of solutions, applications and solvent compatibilities. Fifteen pages of curves show how viscosities of various latices vary with the latex concentrations for a range of thickener concentrations. Suggested end uses include synthetic and natural rubber latex products, rug-backing compounds, adhesives, paper coatings, latex paints, dipping compounds, cleaners and polishes.

•

P-K Lever-Lock Quick Opening Door. (Bulletin No. 2030). Patterson-Kelley Co., Inc., East Stroudsburg, Penna. 8½ x 11 in. 4 pp.

This illustrated bulletin, in two colors, describes the company's quick opening door for heat exchangers, sterilizers and autoclaves. Illustrations show the door in use on horizontal and vertical equipment, with both manual and pneumatic control. A series of six additional photos show the door in pneumatic operation on a vertical heat exchanger. Side and top views of the door in opening and closing positions are given, and the travel arc (45°) necessary to disengage the toggle arm is indicated.

Vulcan 6 in Oil-Extended GR-S Treads: A Report of Road Tests. By Fred H. Amon, Cather P. Louthan and Edward R. Eaton. (Technical Report No. RG-101). Godfrey L. Cabot, Inc., 77 Franklin St., Boston 10, Mass. 8½ x 10¾ in. 28 pp.

Tire and camelback manufacturers are always interested in getting better tread wear and in lowering costs. Recent developments in tread compounding have been the use of ISAF black to improve tread wear and the use of oil-extended GR-S to reduce cost. This report summarizes Cabot road tests comparing ISAF with HAF in cold GR-S, oil-extended GR-S, and in blends of these two polymers. Road tests were made on 60 tires and involved more than 250,000 vehicle miles of road testing. All road tests were run under controlled test fleet conditions and ratings were calculated at tire mileages representing equal treatment of tires in a given road test. This report presents evidence that an ISAF oil-extended GR-S tread can be cheaper than an HAF cold GR-S tread and give appreciably better tread wear.

•

Surface Chemistry. Foster D. Snell, Inc., 29 West 15th St., New York 11, N. Y. 10 x 6¾ in. 12 pp.

The new role of surface chemistry in modern technology is described in this booklet. It describes how surfactants may improve processing. For example, the filtration and drying operations in the manufacture of paint pigments may be entirely eliminated. The preparation of synthetic rubbers by emulsion polymerization utilizes surfactants. Other specific applications cited are in the fields of electroplating and air pollution. In addition, the publication further describes how products, whether they are liquid, gels, powders or solids, lend themselves to improvement with surfactants. Surfactants, according to the booklet, may be designed and synthesized for a specific application which involves the modification of a surface in any particular application or operation.

•

Baldwin-Tate-Emery Universal Testing Machines. (Bulletin No. 4401). Baldwin-Lima-Hamilton Corp., Philadelphia 42, Penna. 8½ x 11 in. 12 pp.

Designed to acquaint the reader with its line of universal testing machines, this booklet helps in the selection and application of the company's hydraulic machines with capacities from 10,000 to 5,000,000 pounds, including standard and special types of vertical and horizontal machines. Schematic drawings as well as photographs are shown for table and floor type machines. An illustrated explanation on hydraulic loading and the independent hydraulic weighing system, which is based on the Emery cell and the Tate-Emery null-balance load indicator, is also given.

•

Hypalon Synthetic Rubber: A New Engineering Material for Industry. Elastomers Division, E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del. 8½ x 11 in. 8 pp.

How to obtain rubber products with greater resistance to deterioration is described in this publication intended for industrial designers and engineers. The booklet touches on the composition and manufacture of "Hypalon" and outlines the characteristics of this material under severe conditions. It shows by examples how these properties have proved advantageous to users of hose, belting, seals, coatings, and other rubber products. No technical data are included since the booklet is not intended as a working tool for rubber technologists.

•

Neoprene Inner Liners for Tubeless Tires. (Report No. BL-296). Elastomers Division, E. I. du Pont de Nemours Co., Inc., Wilmington 98, Del. 6 x 9 in. 8 pp.

Described in this report is a compounding study of Neoprene W and GRT for inner liners. Data on all-neoprene stocks as well as blends of neoprene with natural rubber and GR-S 1500 are given. Compounds are shown in accompanying tables. Their performance is compared with that of a butyl reclaim stock that is in regular commercial use. Data is given on maximum resistance to air diffusion, flex cracking and rim chafing.

RC Plasticizers
FOR
LOW TEMPERATURE FLEX
IN
SYNTHETIC
AND
NATURAL RUBBERS

If You Want...
- Superior Flex
- Reduced Nerve
- Low Volatile Loss
- Smooth Extrusions

RC PLASTICIZERS TG-8 TG-9 BD-8

If You Want...
- Processing Aid
- Resilience
- Gasket Materials
- Excellent Retention

RC PLASTICIZERS DIDA DIOA

Choose the right plasticizer to do the job best. We'll send you a brochure on other RC products that can speed your operation, improve finished products.

RC

Ready...reliable...RC serving American industry, since 1930

WRITE FOR SAMPLES!
RUBBER CORPORATION OF AMERICA
New South Road, Hicksville, N. Y.
Sales Offices: NEW YORK · AKRON · CHICAGO · BOSTON

MARKET REPORTS

TRENDS
NEWS
PRICES

NEW YORK, MARCH 1, 1956

Natural Rubber

Since our last report (February 6), the price of spot rubber on the New York Commodity Exchange has moved in a range of 675 points, high for the period being 39.75c reached on February 7, and low being 33.00c reached on March 1. The average price of spot rubber for the month of February was 36.46c based on 19 trading days. The February figure compares with an average of 41.70c in the previous month.

The trade reports that for the present, world rubber markets are being influenced primarily by the bearish operations on the part of prominent interests at New York and bullish activities by leading Chinese factors in the Singapore market. With this "battle of the giants" in progress, a great majority in the rubber trade, both here and abroad, have adopted an attitude of watchful waiting until there is evidence that one side or the other exhibits some tendency to yield.

Production and Consumption

The International Rubber Study Group reports that world consumption of natural rubber in 1955 totaled 1,830,000 long tons, some 65,000 long tons less than was produced during the year. The organization said that production of natural in December totaled 207,500 long tons, while consumption amounted to 155,000 long tons, including shipments of 4,225 long tons to the Soviet Union and 1,000 long tons to Red China.

World stocks of natural rubber as of December 31 were reported at 885,000 long tons, an increase of 40,000 long tons over the supply on hand a year earlier. Included were 255,000 long tons in producing areas, 397,500 in consuming areas, aside from strategic stockpiles, and 232,500 long tons afloat.

Rubber exports from Indonesia during December were reported at 91,181 long tons, of which 33,067 were of estate origin. On this basis — accepted by the Rubber Study Group at its last meeting in October —of a monthly allowance of 2,500 long tons for non-reported exports, total December exports from Indonesia were 93,681 long tons. This brought the 1955 total to 721,786 tons.

Hits United Nations Embargo

At Singapore, Tengku (Prince) Abdul Rahman, has assailed the United Nations embargo on rubber to Communist China. In an address opening the first general meeting of the Council of Malayan Smallholders Association, an organization of owners of small rubber estates, the Chief Minister of the Federation of Malay States called the embargo "unrealistic and unworkable." "Malayan rubber finds its way into China by devious routes," he said, and therefore was a "big mistake which must be corrected."

Total Malay stocks at the end of January were at the high figure of 136,104 long tons against 122,256 a month before and 121,434 at the end of January last year. The present stock in Malaya is fully 25,000 long tons above the normal level it is said.

Price Data

Closing Rubber Prices on New York Commodity Exchange (No. 1 R.S.S. Contract)

FROM FEBRUARY 7 TO MARCH 1

Feb.	Spot	March	May	July	Sept.	Sales
7	39.75	40.00	37.30	35.75	34.80	268
8	39.00	38.55	36.50	35.05	34.20	319
9	38.50	38.45	36.50	34.95	34.05	59
10	38.00	37.50	35.85	34.60	33.65	513
11	....	....	....	....	....	...
12	....	....	....	....	....	...
13	....	....	....	....	....	...
14	37.25	36.40	35.30	34.30	33.30	434
15	37.25	36.90	35.85	34.65	33.85	201
16	36.75	36.25	35.30	34.20	33.40	228
17	35.25	34.80	34.35	33.40	32.70	440
18	....	....	....	....	....	...
19	....	....	....	....	....	...
20	33.75	33.15	32.85	32.30	31.63	411
21	33.75	33.20	32.75	32.15	31.70	195
22	....	....	....	....	....	...
23	33.25	32.85	32.55	31.90	31.50	513
24	33.75	33.30	33.25	32.35	32.00	419
25	....	....	....	....	....	...
26	....	....	....	....	....	...
27	33.25	32.65	32.65	31.80	31.35	281
28	33.75	33.20	33.20	32.40	31.75	276
29	33.50	33.15	33.00	32.10	31.60	469
Mar. 1	33.00	32.30	32.30	31.40	31.00	345

Outside Market

No. 1 Ribbed Smoked Sheets:	
Spot	.33
March	.32⅞
April	.32¾
Thin Latex Crepe:	
Spot	.37¼
Thin Brown Crepe, No. 2	.31¼
Flat Bark Crepe	.23½

London Market
(Standard Smoked Sheets)

Apr. - June	32.18 - 32.33
July - Sept.	31.01 - 31.16

Singapore Market
(Standard Smoked Sheets)

Apr.	31.20 - 31.35

Middling Upland Quotations

	Feb. 6	March 1		
	Close	High	Low	Close
March	35.00	35.77	35.75	35.77
May	34.55	35.32	35.24	35.32
July	33.60	34.01	33.70	33.98

Notes and Quotes

L. A. McQueen, vice-president in charge of sales for the General Tire & Rubber Co., states that the "big tire" market offers one of the greatest growth opportunities in the rubber industry. "The steady and sizable industry-wide gains in giant tire sales over the past five years are nothing," he said, "in comparison with the potential of the decade ahead." Mr. McQueen opined that the demand for these types of tires will soar to unprecedented heights during the next ten to twelve years. The 40,000 mile Federal Highway Program, when it finally gets started, will make such "tremendous inroads on our production that the industry will eventually be forced to double its output," he stated. General Tire, Mr. McQueen stated, has already scheduled a $1,000,000 expansion in its giant tire production facilities.

Synthetic Rubber

The Rubber Manufacturers Association reports that American producers of synthetic rubber entered the year 1956 by establishing a new production record of 93,485 long tons of synthetic rubber during January, 1956. This compares with the 90,319 long tons produced during the month of December, and tops the previous record of 91,281 long tons produced in November of 1955.

Consumption of new rubbers during January continued at high levels when 133,335 long tons of all types of new rubber were consumed. Of this total, 79,648 long tons, or 59.74%, were synthetic rubbers.

The consumption of synthetic rubber in December was 75,943 long tons, and in January of 1955 amounted to 68,456 long tons. The percentage of synthetic rubbers consumed to total new rubber for the year 1955 was 58.48% and during December stood at 60.99%.

Copolymer Plant Sales

Two events of importance to the synthetic rubber industry transpired during the past few weeks. One, of course, was the sale of the Institute, West Va., synthetic rubber plant to Goodrich-Gulf Chemicals, Inc. The other, was the decision by the University of Akron to give up its operation of the government's synthetic rubber laboratories and pilot plant as of June 30, 1956.

The sale of the Institute facility to Goodrich-Gulf leaves only 1 of the 27 facilities originally put up for sale by the government unsold. That unit, an alcohol-butadiene facility at Louisville, Ky., has been leased to Publicker Industries, Inc., of Philadelphia, Penna., for a three-year period. Moreover, bills were recently introduced in the House and Senate calling for the outright sale or long-term lease of this plant. It may yet be that all 27 of the plants originally put up for sale will be sold. The record of achievement of the Rubber Producing Facilities Disposal Commission in attaining this record has been universally applauded.

Not only have almost all of the plants been sold, but most of the purchasers are already expanding their purchases. Almost before the ink was dry on the contracts, Goodrich-Gulf announced plans for an extensive modernization of the Institute plant. This eagerness to grow and expand betokens well for the future of the rubber industry.

University Makes Decision

Officials at the University of Akron announced their decision to relinquish operations at the government laboratories "reluctantly and regretfully." The news is heartening, however, in that the University now plans to establish a Rubber Research Institute as an outgrowth of its Department of Rubber Research. It is now expected that the government facilities operated by the University will go on public sale on June 30, 1956. The University has been operating the synthetic rubber laboratories and pilot plant since 1944, and received a management fee of $50,000 a year for its service.

The only antioxidants that have proved these claims in use!

most active...
most resistant to discoloration

ANTIOXIDANT 2246®

(highest efficiency for general application)

ANTIOXIDANT 425®

(when minimum discoloration is essential)

Rely on products proved in industry use—time and time again.

Only Cyanamid's two great antioxidants have proved their claims in use... month in, month out... acquiring an enviable reputation for performance throughout the industry.

And in the rubber industry, only *performance* counts. You get it—in full measure—from Cyanamid's antioxidants, the only ones proved-in-use to give the best performance, the finest results... *for every antioxidant dollar you spend!*

CYANAMID

AMERICAN CYANAMID COMPANY

RUBBER CHEMICALS DEPARTMENT

BOUND BROOK, NEW JERSEY

SALES REPRESENTATIVES AND WAREHOUSE STOCKS: Akron Chemical Company, Akron, Ohio • H. M. Royal, Inc., Trenton, N. J. • H. M. Royal, Inc., Los Angeles, Calif. • Ernest Jacoby & Co., Inc., Boston, Mass. • Herron & Meyer of Chicago, Chicago, Ill. • In Canada: St. Lawrence Chemical Company, Ltd., Montreal and Toronto.

PRICES OF COMMERCIALLY AVAILABLE SYNTHETIC RUBBER POLYMERS

(dry types—per pound carload unless otherwise specified)

Butadiene-Acrylonitrile Types

Butaprene NAA	.5400 [1]
Butaprene NF	.4900 [1]
Butaprene NL	.5000 [1]
Butaprene NXM	.5800 [1]
Chemigum N1	.6400 [3]
Chemigum N3	.5800 [3]
Chemigum N5	.5800 [3]
Chemigum N6	.5000 [3]
Chemigum N7	.5000 [3]
Hycar 1001	.5800 [2]
Hycar 1002	.5000 [2]
Hycar 1014	.6000 [2]
Hycar 1041	.5800 [2]
Hycar 1042	.5000 [2]
Hycar 1043	.5000 [2]
Hycar 1312	.6000 [2]
Hycar 1411	.6200 [2]
Hycar 1432	.5900 [2]
Hycar 1441	.6200 [2]
Paracril B	.5000 [2]
Paracril BJ	.5000 [2]
Paracril C	.5800 [2]
Polysar Krynac 800	.5000 [2]
Polysar Krynac 801	.5800 [2]
Polysar Krynac 802	.5000 [2]
Polysar Krynac 803	.5000 [2]
Naugapol 1018	.2700 [2]

Butadiene-Styrene Types

Ameripol 1001	.2410 [2]
Ameripol 1002	.2435 [2]
Ameripol 1006	.2410 [2]
Ameripol 1500	.2410 [2]
Ameripol 1501	.2410 [2]
Ameripol 1502	.2410 [2]
Ameripol 1703	.2060 [2]
Ameripol 1705	.2035 [2]
Ameripol 1706	.2035 [2]
Ameripol 1707	.1910 [2]
Ameripol 1709	.1885 [2]
Ameripol 1710	.1885 [2]
Ameripol 1711	.1885 [2]
Ameripol 1712	.1885 [2]
ASRC 1500	.2410 [2]
ASRC 1502	.2410 [2]
Baytown 1600	.1850 [2]
Baytown 1601	.1850 [2]
Baytown 1602	.1850 [2]
Baytown 1801	.1700 [2]
Butaprene S-1000	.2300 [2]
Butaprene S-1001	.2300 [2]
Butaprene S-1004	.2300 [2]
Butaprene S-1006	.2300 [2]
Butaprene S-1009	.2600 [2]
Butaprene S-1010	.2650 [2]
Butaprene S-1012	.2700 [2]
Butaprene S-1013	.2600 [2]
Butaprene S-1015	.2800 [2]
Butaprene S-1500	.2300 [2]
Butaprene S-1502	.2300 [2]
Butaprene S-1703	.1950 [2]
Butaprene S-1705	.1925 [2]
Butaprene S-1710	.1775 [2]
Copo 1500	.2410 [2]
Copo 1502	.2410 [2]
Copo 1712	.1885 [2]
Naugapol 1016	.2650 [2]

Butadiene-Styrene (Cont'd)

Naugapol 1018	.2700 [2]
Naugapol 1019	.2650 [2]
Naugapol 1021	.3000 [2]
Naugapol 1022	.2800 [2]
Naugapol 1023	.2850 [2]
Naugapol 1503	.2700 [2]
Naugapol 1504	.2950 [2]
Philprene 1000	.2500 [1]
Philprene 1001	.2500 [1]
Philprene 1006	.2500 [1]
Philprene 1009	.2550 [1]
Philprene 1018	.2700 [1]
Philprene 1019	.2650 [1]
Philprene 1100	.1990 [1]
Philprene 1104	.1940 [1]
Philprene 1500	.2500 [1]
Philprene 1502	.2500 [1]
Philprene 1503	.2700 [1]
Philprene 1600	.2000 [1]
Philprene 1601	.2000 [1]
Philprene 1602	.2000 [1]
Philprene 1605	.1940 [1]
Philprene 1703	.2120 [1]
Philprene 1706	.2100 [1]
Philprene 1708	.1970 [1]
Philprene 1711	.1940 [1]
Philprene 1712	.1940 [1]
Philprene 1803	.1800 [1]
Plioflex 1000	.2425 [2]
Plioflex 1006	.2425 [2]
Plioflex 1502	.2425 [2]
Plioflex 1703	.2075 [2]
Plioflex 1710	.1900 [2]
Polysar Krylene	.2410 [2]
Polysar Krylene NS	.2410 [2]
Polysar Krynol	.2000 [2]
Polysar Krynol NS	.2050 [2]
Polysar S	.2410 [2]
Polysar S-50	.2410 [2]
Polysar S-65	.2410 [2]
Polysar S-X 371	.2550 [2]
Polysar SS-250	.3000 [2]
S-1000	.2300 [2]
S-1001	.2300 [2]
S-1002	.2325 [2]
S-1006	.2300 [2]
S-1011	.2325 [2]
S-1013	.2300 [2]
S-1100	.1850 [2]
S-1500	.2300 [2]
S-1501	.2300 [2]
S-1502	.2300 [2]
S-1600	.1850 [2]
S-1601	.1850 [2]
S-1602	.1850 [2]
S-1703	.1950 [2]
S-1705	.1925 [2]
S-1706	.1925 [2]
S-1707	.1800 [2]
S-1709	.1775 [2]
S-1712	.1775 [2]
S-1801	.1700 [2]
S-2000	.2275 [2]
S-2101	.2250 [2]
Synpol 1000	.2425 [2]
Synpol 1001	.2425 [2]
Synpol 1002	.2450 [2]
Synpol 1006	.2425 [2]
Synpol 1007	.2425 [2]

Butadiene-Styrene (Cont'd)

Synpol 1009	.2475 [2]
Synpol 1012	.2425 [2]
Synpol 1013	.2500 [2]
Synpol 1500	.2425 [2]
Synpol 1551	.2425 [2]
Synpol 1703	.2075 [2]
Synpol 1707	.1925 [2]
Synpol 1708	.1950 [2]
Synpol 1710	.1900 [2]
Synpol 1711	.1900 [2]

Butyl Rubbers

Enjay Butyl 035	.2300 [2]
Enjay Butyl 150	.2300 [2]
Enjay Butyl 165 NS	.2400 [2]
Enjay Butyl 215	.2300 [2]
Enjay Butyl 217	.2300 [2]
Enjay Butyl 218	.2300 [2]
Enjay Butyl 268 NS	.2400 [2]
Enjay Butyl 325	.2300 [2]
Enjay Butyl 365 NS	.2400 [2]
Polysar Butyl 100	.2450 [2]
Polysar Butyl 101	.2775 [2]
Polysar Butyl 200	.2450 [2]
Polysar Butyl 300	.2450 [2]
Polysar Butyl 301	.2550 [2]
Polysar Butyl 400	.2450 [2]

Neoprene

	(prices l.c.l.)
Neoprene Types AC and CG	.5500 [2]
Neoprene Type GN	.4100 [2]
Neoprene Type GN-A	.4100 [2]
Neoprene Type GN-A-P	.3400 [2]
Neoprene Type GN-P	.3400 [2]
Neoprene Type GN-Special	.3400 [2]
Neoprene Type GN-A-Special	.3400 [2]
Neoprene Type GRT	.4200 [2]
Neoprene Type KNR	.7500 [2]
Neoprene Type S	.4200 [2]
Neoprene Type W	.3900 [2]
Neoprene Type WHV	.3900 [2]
Neoprene Type W-P	.3400 [2]
Neoprene Type W-Special	.3400 [2]
Neoprene Type WRT	.4500 [2]

Silicone Rubbers

	(prices l.c.l.)
GE (compounded)	2.50 [2]
GE Silicone Gum (not compounded)	4.00 [2]
Silastic (compounded)	1.95 [2]

Polysulfide Rubbers

	(prices l.c.l.)
Thiokol Type A	.4700 [2]
Thiokol Type FA	.6400 [2]
Thiokol PR-1	.9500 [2]
Thiokol Type ST	1.00 [2]

(latices—all prices per pound dry weight)

Butadiene-Acrylonitrile Types

Butaprene N-300	.4600 [1]
Butaprene N-400	.5400 [1]
Butaprene N-401	.5400 [1]
Chemigum 200	.4900 [3]
Chemigum 235	.5400 [3]
Chemigum 236	.5400 [3]
Chemigum 245	.4600 [3]
Chemigum 246	.4600 [3]
Hycar 1512	.4600 [2]
Hycar 1551	.5400 [2]
Hycar 1552	.4600 [2]
Hycar 1561	.5400 [2]
Hycar 1562	.4600 [2]
Hycar 1571	.5900 [2]
Hycar 1572	.5100 [2]
Hycar 1577	.4600 [2]

Butadiene-Styrene Types

Butaprene S-2000	.2600 [2]
Butaprene S-2001	.2600 [2]

Butadiene-Styrene (Cont'd)

Butaprene S-2002	.2850 [2]
Butaprene S-2003	.2950 [2]
Butaprene S-2004	.2950 [2]
Butaprene S-2006	.2600 [2]
Copo 2101	.2800 [2]
Copo 2102	.3100 [2]
Copo 2105	.3100 [2]
Copo X-765	.2900 [2]
Pliolite 2101	.3000 [2]
Pliolite 2104	.3200 [2]
Pliolite 2105	.3200 [2]
Pliolite X-765	.3000 [2]
Naugatex 2000	.2630 [2]
Naugatex 2001	.2630 [2]
Naugatex 2002	.2880 [2]
Naugatex 2005	.3000 [2]
Naugatex 2006	.2630 [2]
Naugatex 2101	.2850 [2]
Naugatex 2105	.3120 [2]
Naugatex X-767	.3230 [2]

Butadiene-Styrene (Cont'd)

S 2000	.2275 [2]
S 2004	.2600 [2]
S 2101	.2250 [2]

Neoprene

Neoprene Latex 60	.4000 [2]
Neoprene Latex 571	.3700 [2]
Neoprene Latex 572	.3900 [2]
Neoprene Latex 601-A	.4000 [2]
Neoprene Latex 735	.3800 [2]
Neoprene Latex 736	.3800 [2]
Neoprene Latex 842-A	.3700 [2]
Neoprene Latex 950	.4700 [2]

Polysulfide Rubbers

Thiokol Type MX	.7000 [2]
Thiokol Type WD-2	.9200 [2]
Thiokol Type WD-6	.7000 [2]

Notes: (1) Freight allowed. (2) Freight extra. (3) Freight prepaid.

the *new* 1955-56 edition

Rubber RED BOOK

Directory of the Rubber Industry

1250 pages of vital information on sources of supply

price: $10.00

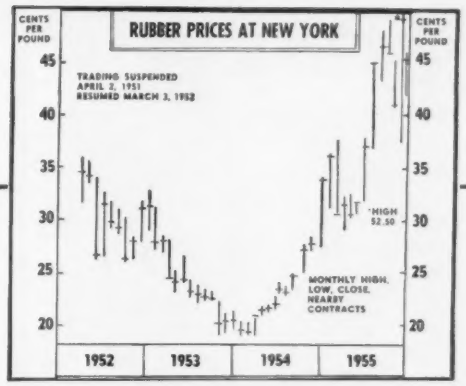
add 3% Sales Tax — 30c for New York City copies

send your order to

RUBBER AGE

101 West 31st Street

New York 1, New York



• ***There it is at a glance***— the fundamental reason for using the futures markets to protect your commitments in rubber.

When prices can swing all the way from 19.35¢ in March of '54 to 52.50¢ in November of '55—then back again to less than 36¢ this February—it's only good sense to do all that you can to minimize your risks, to get all the facts and information available on rubber.

In this connection, you might like to have a copy of our basic booklet called "*How to Hedge Commodities*" . . . our latest pamphlet on rubber that gives you all the fundamental details on the current picture in supply and demand — and your own copy of our regular biweekly letters on rubber.

There's no charge for any of them, of course. They're yours for the asking.

Simply call or write—

COMMODITY DIVISION

Merrill Lynch, Pierce, Fenner & Beane

70 Pine Street, New York 5, N. Y.

Offices in 108 Cities

MARKETS (continued)

Reclaimed Rubber

Final figures made available from the U. S. Department of Commerce indicate that 326,697 long tons of reclaimed rubber were produced in the United States in 1955, compared with the 258,101 produced in 1954 and the 298,336 long tons produced in 1953. Within the past ten years, only 1951 with 366,700 long tons, topped the levels reached in 1955.

Consumption of reclaimed rubber in 1955 has been set at 314,870 long tons against the 249,049 long tons consumed in 1954 and the 285,050 long tons used in 1953. Here too, this figure was topped by the 1951 consumption, when 346,121 long tons were consumed. It should be remembered that in 1951, however, the Korean conflict lent impetus to both production and consumption. It is interesting to note that in 1951 the proportion of reclaim consumed to total new rubber stood at 28.6%. In 1955 it was 20.7%.

(Prices for All Areas Except Calif.)

	per lb.
Premium Grade Whole Tire	.11
First Line Whole Tire	.10½
Second Line Whole Tire	.10
Third Line Whole Tire	.09¾
Fourth Line Whole Tire	.09¼
Black Carcass	.14¾
No. 1 Light Colored Carcass	.20¾
No. 1 Peel	.11
Butyl Tube Reclaim	.15½
Natural Rubber Black Tube	.15
Natural Rubber Red Tube	.21
Natural Rubber Gray Tube	.21

Scrap Rubber

The scrap rubber market continues at the slow pace it has evidenced during the past few weeks. Dealers, in general, are working on shipments of mixed automobile tires, but reclaimer operations were reported to have slowed down to some extent. It is also reported that the tube section of the market is weaker and Butyl tubes, in particular, are said to be easier.

Of course, the scrap rubber market is caught in a cycle not of its own making. As the automobile industry slows down, so does the reclaim industry. And as the reclaim industry rides, so rides the scrap dealer. Falling rubber prices also tend to complicate the situation somewhat. As to the future, most in the trade are loathe to predict what may lie ahead in the weeks to come.

(Prices Delivered Akron)

Mixed tires	ton	18.00
Light colored carcass	lb.	.05¼
No. 1 peelings	ton	45.00
No. 2 peelings	ton	30.00
No. 3 peelings	ton	21.00
Buffings	ton	17.00
Truck and Bus S.A.G.	ton	17.00
Passenger S.A.G.	ton	15.00
Natural Rubber Red Tubes	lb.	.07½
Natural Rubber Black Tubes	lb.	.06
Butyl Rubber Tubes	lb.	nom.

Tire Fabrics

Fourth quarter 1955 production of tire cord and tire fabric dropped off 1% from the third quarter but climbed to 12% over the same period of 1954, the Bureau of the Census has reported. Total output during October-December was 130,030,000 pounds of which 101,943,000 was rayon cord and fabric. This latter figure was 1% above third quarter totals.

Nylon cord and cord fabric output rose 6% over the third quarter, but production of cotton cord and fabric declined sharply by 25%. Stocks of all cord and fabrics stood at 55,818,000 pounds on December 31, 1955, 2% below the figure of October 1.

Army Duck Demand Strong

The trade reports that the demand for cotton ducks, particularly Army and numbered types, is continuing to run quite strong, with buyers looking for these goods for earliest possible delivery. In Army ducks, many consumers are seeking spot or nearby delivery but the tight delivery position of mills is making it necessary to cover further ahead. Most mills are sold up to 45 to 60 days ahead on Army ducks, and on the majority of constructions, have no goods left to offer for March shipment.

Trading in numbered ducks, which are not in as tight supply as Army types, generally involves spot and nearby delivery, trade sources state. Prices are unchanged but firm. The demand for most flat duck is not as strong at present as for Army and numbered varieties, but mills in a number of cases are sold up 30 to 45 days ahead.

In wide industrial fabrics for coating, trading remains slow due to the lack of demand from the automobile industry. A moderate amount of deferred delivery requests have been received by cloth mills from coaters as the result of the continued slowdown in the automobile industry. Prices of wide goods, however, are still holding firm due to the fairly good volume of order backlogs on mills' books.

Japan Rayon Export Threat

Another potential threat to the U. S. textile industry has been posed, with overseas reports that Japanese production of rayon staple fiber this year will probably exceed 700,000,000 pounds, for a gain of about 30% over the 1955 total of 531,000,000. Rayon staple output in the U. S. last year totaled 338,000,000 pounds, and the total U. S. projected capacity to July, 1956, is 472,000,000. The third leading producer in 1955 was West Germany, followed by the United Kingdom, Italy and France.

(Prices f.o.b. Shipping Point)

Rayon Tire Cord

1100	lb.	.81
1650	lb.	.76½
2200	lb.	.76

Nylon Tire Cord

210	lb.	2.00
840	lb.	2.00

Rayon Graded Fabric

1100	lb.	.77
1650	lb.	.72½
2200	lb.	.71½

Cotton Chafers

14.4 oz. (per square yard)	lb.	.70
9.25 oz. (per square yard)	lb.	.65
11.65 oz. (per square yard)	lb.	.61
8.9 oz. (per square yard)	lb.	.67

Liquid Latex

Natural: The U. S. Department of Commerce reports that 86,390 long tons of natural rubber latex were imported into the United States in 1955, compared with the 74,483 long tons imported in the previous year. Consumption of natural latex in 1955 has been set at 83,807 long tons, against the 75,931 long tons consumed in 1954. As of December 31, 1955, there were 12,645 long tons of natural latex on hand, about 1,500 long tons more than were on hand as of December 31, 1954.

During the past few weeks, prices for Hevea latex, in bulk, have ranged from 39c to 40c per pound, East Coast port. Advices from Malaya state that December production of latex at 10,165 long tons set a new record. Some market heaviness has been reported in the U. S. and some in the trade feel that large production will not serve to ease the situation.

Synthetic: The Commerce Department states that in the year just passed, 90,954 long tons of synthetic latex were produced, including 69,364 long tons of GR-S types; 10,432 long tons of neoprene latex and 10,798 of N-types. In the previous year, 63,459 long tons of synthetic latex were produced, including 48,379 in GR-S types; 8,214 in neoprene latex, and 6,866 long tons of N-type.

It is also estimated by the Commerce Department, that 76,660 long tons of all types of synthetic latex were consumed in the United States in 1955. This is 20,000 long tons more than were consumed in the previous year, with a jump of about 15,000 long tons recorded in the GR-S types alone.

Cotton

The price of middling uplands on the New York Cotton Exchange has moved in a rather narrow range of 85 points since our last report (February 6), high for the period being 36.65c reached on February 23 and again on February 24, and low being 35.80c reached on February 7. The average price of middling uplands for the month of February was 36.26c based on 19 trading days. This figure compares with an average of 35.24c in the previous month.

It is reported by some in the trade that sentiment in the cotton market is slightly reactionary. The bearish effect of the announcement of an export sales program to take effect August 1, and the lower parity price, did not influence the old crop months. May was particularly strong, because the trade thinks that if the mills want cotton in May they will have to bid the price up to get it out of loan stock.

However, the export program could create a sounder market. With cotton selling at a supply and demand price, there will be more willingness on the part of users to contract ahead. The selling price of the surplus, however, may cut down the demand for new crop cotton, and this cotton may have to move into the loan, which, it is estimated, will be around 31.25c for middling inch cotton.

The International Cotton Advisory Committee states that the world cotton carryover on August 1 will be up nearly 3,000,000 bales, with almost all of the increase in the U. S. Carryover stocks will be about 23,200,000 bales compared with 20,400,000 bales last year.

Our Technical Service Laboratory Will Help You Build Better Products With Neville Resins

If you are not already using Neville coumarone-indene resins in the manufacture of your rubber products, it will pay you to request the assistance of our Technical Service Laboratory. Our chemists will work with yours in choosing the exact grade to suit your need. Neville coumarone-indene resins are ideal extender-plasticizers. They aid processing and add tensile strength and durability to finished compounds. Write for details.

Neville Chemical Company, Pittsburgh 25, Pa.

Resins—Coumarone-Indene, Heat Reactive, Phenol Modified Coumarone-Indene, Petroleum, Alkylated Phenol • **Oils**—Shingle Stain, Neutral, Plasticizing, Rubber Reclaiming • **Solvents**—2-50 W Hi-Flash, Wire Enamel Thinners.

NEVILLE

Please send information on Neville Chemicals.

NAME TITLE

COMPANY

ADDRESS

CITY STATE

NC 11-RA

STATISTICS of the industry

PERTINENT INDUSTRY DATA

Natural Rubber in the United States

(Including Latex and Guayule)

(All Quantities in Long Tons)

Year	New Supply	Consumption	Re-Exports	Stocks On Hand at End of Period
1928	439,731	437,000	32,159	65,454
1929	565,087	467,400	36,485	118,609
1930	487,628	376,000	30,205	201,000
1931	501,788	355,200	25,609	322,000
1932	414,668	336,700	20,937	379,000
1933	418,902	412,400	20,576	365,000
1934	463,018	462,500	23,856	355,000
1935	467,146	495,500	11,391	303,000
1936	488,145	575,000	12,582	223,000
1937	600,479	543,600	7,902	262,204
1938	411,983	437,031	5,652	231,500
1939	499,473	592,000	13,125	125,800
1940	818,243	648,500	7,060	288,864
1941	1,029,007	775,000	5,376	533,344
1942	282,653	376,791	10,856	422,714
1943	55,329	317,634	20,815	139,594
1944	107,834	144,113	9,665	93,650
1945	135,672	105,429	6,743	118,715
1946	400,687	277,597	4,338	237,467
1947	688,354	562,661	4,101	129,038
1948	735,227	627,332	6,673	141,541
1949	660,792	574,522	6,253	106,619
1950	802,249	720,268	8,644	89,215
1951	733,048	454,015	2,603	76,569
1952	805,997	453,846	3,024	95,260
1953	647,150	553,473	8,376	112,316
1954	596,848	596,285	7,443	104,543
1955	637,608	633,006	10,228	109,854
1955:				
Jan.	49,941	56,911	909	101,050
Feb.	50,880	50,997	718	97,189
Mar.	61,250	58,472	691	102,058
Apr.	61,113	53,781	892	101,620
May	61,042	54,746	683	106,650
June	52,762	56,282	682	101,491
July	53,626	46,166	906	105,782
Aug.	59,840	48,359	810	109,056
Sept.	50,459	50,963	980	113,185
Oct.	45,720	54,995	869	110,795
Nov.	50,509	52,769	1,102	103,764
Dec.	50,556	48,565	986	109,854

Source: U. S. Department of Commerce.

U. S. Imports of Natural Rubber

Year	Dry Long Tons	Dry Declared Value	Latex Long Tons	Latex Declared Value	Total Imports
1931	497,176	72,922,845	4,675	888,909	501,851
1932	409,556	31,936,459	5,112	601,999	414,668
1933	407,817	44,034,064	11,085	1,833,671	418,902
1934	449,513	97,929,676	13,107	3,643,221	462,620
1935	453,134	115,299,448	13,553	3,782,222	466,687
1936	467,064	152,072,496	19,852	6,659,899	486,916
1937	574,600	237,307,041	23,185	10,213,670	597,785
1938	397,640	125,373,864	11,944	4,168,127	409,584
1939	469,946	167,586,780	27,437	10,467,552	497,383
1940	781,202	303,308,823	33,789	14,593,466	814,991
1941	989,498	401,976,317	34,797	15,965,627	1,024,245
1942	266,276	112,537,426	10,646	5,630,667	276,922
1943	50,358	31,369,198	1,890	1,312,202	52,248
1944	103,847	73,908,549	3,091	2,092,211	106,938
1945	134,408	95,814,102	4,773	3,115,853	139,181
1946	376,502	228,796,110	8,421	5,843,085	384,923
1947	691,087	306,951,814	17,542	9,787,722	708,629
1948	702,293	290,849,177	32,745	18,288,223	735,038
1949	630,808	225,343,624	29,743	14,968,650	660,551
1950	747,109	416,222,598	54,401	41,764,486	801,510
1951	677,874	727,343,348	54,963	80,178,309	732,837
1952	756,987	578,179,519	48,228	40,563,116	805,215
1953	571,635	284,909,223	75,511	46,353,333	647,146
1954	522,364	219,098,143	74,483	42,755,029	596,847
1955:					
Jan.	42,088	22,245,606	7,853	5,473,260	49,941
Feb.	44,770	26,161,643	6,110	4,196,213	50,880
Mar.	53,639	33,482,831	7,611	5,987,304	61,250
Apr.	52,563	33,425,499	8,549	7,235,327	61,112
May	52,192	32,621,824	8,849	6,968,726	61,041
June	45,025	27,959,320	7,736	6,015,080	52,761
July	34,924	21,653,274	8,702	6,855,619	43,626
Aug.	50,954	32,782,273	8,886	7,071,971	59,840
Sept.	42,350	29,854,781	8,108	7,902,094	50,458
Oct.	38,820	30,746,494	6,900	7,539,732	45,720

Source: Bureau of the Census, U. S. Department of Commerce.

World Production of Natural Rubber

(Including Latex)

(Long Tons)

Year	Malaya	Indonesia	Ceylon	Viet Nam & Cambodia	Latin America	Rest of World*	Total*
1943	75,000*	100,000*	105,500	70,370	41,900	72,507	465,000
1944	25,000*	50,000*	98,500	60,419	49,946	77,000	360,000
1945	8,600*	10,000*	97,500	12,000*	47,125	73,570	250,000
1946	403,719	175,000*	94,000	19,975	39,678*	105,080	837,500
1947	646,362	277,951	89,000	38,128	34,928*	172,782	1,260,000
1948	698,189	432,349	95,000	43,935	29,158*	225,557	1,525,000
1949	671,503	432,996	89,500	43,010	27,318*	225,659	1,490,000
1950	694,090	696,472	113,500	48,482	26,902*	280,299	1,860,000
1951	605,346	814,406	105,000	52,136	29,777*	278,262	1,885,000
1952	584,238	750,494	96,500	63,134	35,475*	261,211	1,790,000
1953	574,390	692,164	98,610	74,545	35,318*	250,182	1,725,000
1954	584,435	738,670	93,935	78,024	26,833*	280,112	1,802,500
1955:							
Apr.	44,716	48,198	7,049	4,708	500*	26,823	135,000
May	49,798	47,960	5,440	5,748	500*	16,998	135,000
June	50,474	74,162	5,835	6,168	2,880	26,037	165,000
July	56,030	53,779	8,457	7,055	2,098	17,609	152,500
Aug.	54,357	63,218	9,698	7,564	1,129	21,407	165,000
Sept.	56,190	65,357	7,797	7,497	1,480	20,173	167,500
Oct.	54,835	66,814	9,307	8,509	1,611	28,924	170,000
Nov.	52,084	60,673	9,602	.....	1,939	33,218	157,500

Source: International Rubber Study Group. * Estimated.

World Consumption of Natural and Synthetic Rubber

(Including Latex)

(Long Tons)

Year	United States	United Kingdom	Canada	Europe*	Rest of World*	Total*
1943	488,525	66,730	32,896	150,000	156,104	907,500
1944	710,783	86,977	34,310	132,500	160,690	1,125,000
1945	799,009	91,047	41,836	87,500	108,164	1,127,500
1946	1,039,296	126,770	39,196	145,000	115,804	1,467,500
1947	1,122,327	156,399	61,453	242,500	153,548	1,735,000
1948	1,069,404	196,286	62,121	392,000	182,379	1,902,500
1949	988,903	186,622	56,362	446,500	207,388	1,887,500
1950	1,258,557	222,425	68,695	448,500	287,055	2,285,000
1951	1,214,298	238,101	70,809	476,500	314,941	2,312,500
1952	1,261,413	202,179	67,099	550,000	254,901	2,335,000
1953	1,338,309	211,453	73,394	521,000	343,606	2,500,000
1954	1,233,012	247,612	71,656	544,250	408,094	2,505,000
1955:						
Mar.	135,590	22,648	7,508	48,000	36,254	250,000
Apr.	125,059	24,872	6,829	51,750	48,500	242,500
May	130,475	21,903	7,107	49,500	52,250	247,500
June	136,464	19,852	7,619	52,750	50,250	255,000
July	109,498	19,710	5,443	45,750	53,500	212,500
Aug.	121,703	17,538	5,554	39,750	47,250	217,500
Sept.	127,681	21,680	7,697	39,750	43,192	240,000
Oct.	135,372	25,484	7,415	49,000	45,229	262,500
Nov.	134,769	22,335	8,570	63,250	36,076	265,000

Source: International Rubber Study Group. * Estimated.

Rim Production

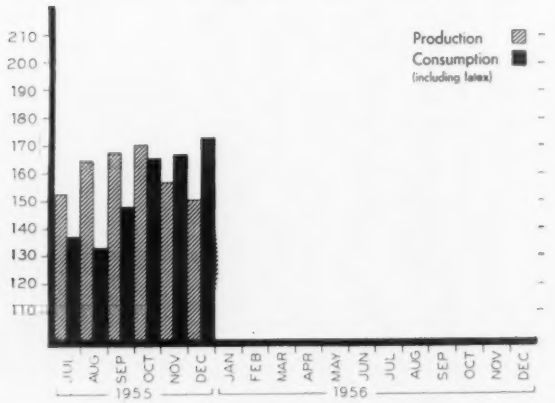
	1951	1952	1953	1954	1955
Passenger Car	29,145,367	24,936,844	31,318,461	25,952,322	38,092,080
Truck & Bus	6,877,419	5,752,674	5,228,321	4,463,689	6,642,329
Agricultural	3,019,581	2,073,116	1,943,487	1,297,040	1,931,768
Earth Mover	28,026	31,791	24,685	21,536	38,859
Total	39,070,393	32,794,425	38,514,954	31,734,587	46,705,036

	1955 Aug.	Sept.	Oct.	Nov.	Dec.	1956 Jan.
Passenger Car	2,840,789	2,154,381	2,831,566	3,424,887	3,224,232	2,911,466
Truck & Bus	590,638	512,676	495,813	539,802	492,964	620,729
Agricultural	158,962	114,971	141,336	149,358	203,534	183,462
Earth Mover	2,554	3,601	4,494	5,343	4,084	5,930
Total	3,592,952	2,785,629	3,473,209	4,119,390	3,924,814	3,721,587

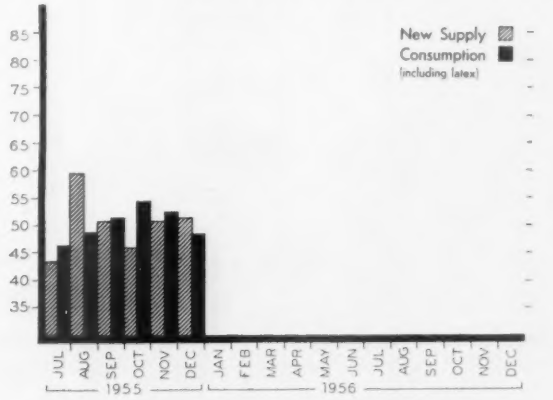
Source: The Tire & Rim Association, Inc.

STATISTICS at a glance

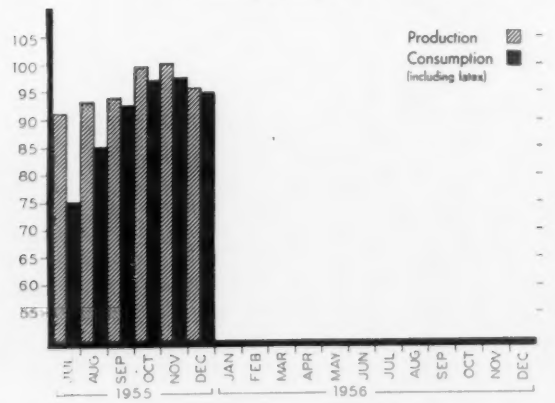
NATURAL RUBBER—WORLD
(thousands of long tons)



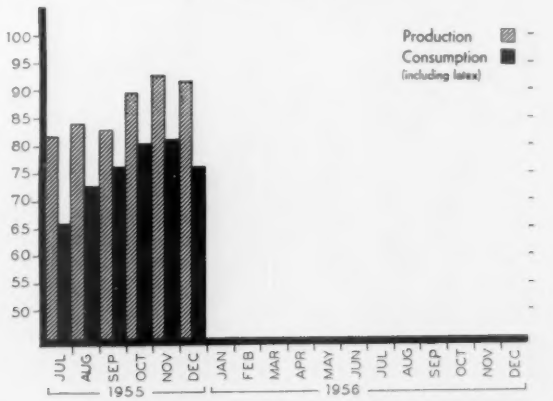
NATURAL RUBBER—UNITED STATES
(thousands of long tons)



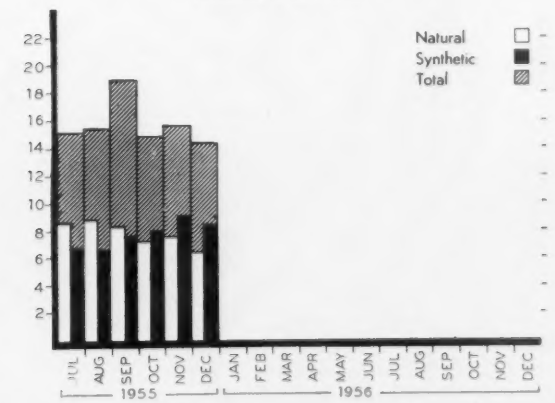
SYNTHETIC RUBBER—WORLD
(thousands of long tons)



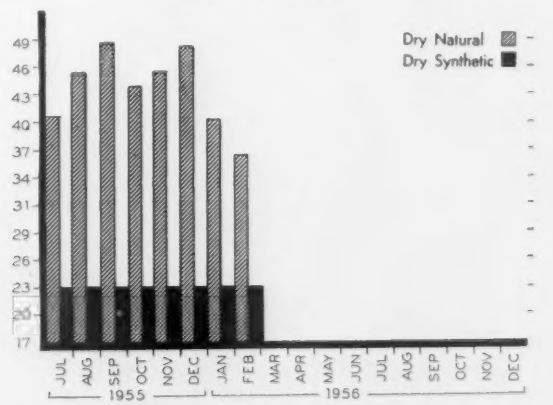
SYNTHETIC RUBBER—UNITED STATES
(thousands of long tons)



LATEX CONSUMPTION—UNITED STATES
(thousands of long tons)



PRICES—NATURAL AND SYNTHETIC
(cents per pound)



Synthetic Rubber in the United States

(All Quantities in Long Tons)

New Supply

Year	GR-S	Neoprene	Butyl	N-Type	Total
1949	310,599	35,215	54,046	11,072	410,932
1950	378,887	50,067	60,915	12,037	501,906
1951	704,529	58,907	76,475	15,333	855,244
1952	654,854	65,745	81,630	16,228	818,447
1953	680,728	80,495	79,801	20,198	861,222
1954	490,405	69,150	58,802	21,396	639,753
1955	801,126	91,357	56,179	32,623	981,285
1955:					
Jan.	59,043	6,983	3,220	2,099	71,345
Feb.	56,442	6,910	3,727	1,729	68,808
Mar.	65,169	7,132	5,256	2,158	79,715
Apr.	60,826	8,359	5,148	2,433	76,766
May	66,872	7,852	5,115	2,720	82,559
June	65,456	5,919	3,872	3,422	78,669
July	66,550	6,904	5,395	3,195	82,044
Aug.	68,898	8,511	4,203	2,792	84,404
Sept.	68,228	7,677	5,097	2,821	83,823
Oct.	73,103	8,118	5,501	2,958	89,680
Nov.	75,745	8,537	4,935	2,931	92,148
Dec.	74,794	8,455	4,710	3,068	91,027

Consumption

1949	299,420	31,753	50,855	8,827	414,381
1950	416,230	43,781	66,348	11,930	538,289
1951	626,444	48,887	70,500	13,066	758,897
1952	666,420	55,522	71,229	13,866	807,037
1953	624,181	65,900	77,826	16,929	784,836
1954	500,345	57,203	61,464	17,715	636,727
1955	738,760	72,881	53,238	4,526	869,405
1955:					
Jan.	56,371	5,676	4,478	1,854	68,379
Feb.	56,000	5,476	4,312	1,826	67,614
Mar.	63,737	6,423	4,839	2,119	77,118
Apr.	59,746	5,884	4,321	2,172	72,123
May	63,825	6,143	4,455	1,965	76,388
June	72,256	6,320	4,704	2,581	85,861
July	55,610	4,294	3,894	1,621	65,419
Aug.	59,746	6,450	4,307	2,219	72,722
Sept.	63,330	6,197	4,578	2,270	76,375
Oct.	66,744	6,626	4,739	2,280	80,389
Nov.	68,111	6,896	4,420	2,234	81,661
Dec.	63,137	6,496	4,197	2,113	75,943

Exports

1949	1,401	3,330	178	1,574	6,483
1950	900	4,826	31	1,895	7,652
1951	483	6,825	216	1,725	9,249
1952	9,467	9,813	126	2,695	22,101
1953	7,692	11,494	237	3,245	22,668
1954	11,069	12,062	2,831	4,155	30,117
1955	61,259	18,022	9,558	4,526	93,365
1955:					
Jan.	1,381	1,046	716	194	3,337
Feb.	1,331	1,049	370	259	3,009
Mar.	2,162	1,287	672	236	4,357
Apr.	1,807	1,636	1,562	506	5,511
May	3,500	1,430	376	357	5,663
June	6,030	1,541	726	389	8,686
July	5,212	1,275	870	472	7,829
Aug.	7,727	1,454	837	386	10,407
Sept.	8,598	1,946	526	602	11,672
Oct.	7,888	1,748	1,041	444	11,121
Nov.	7,786	1,824	894	306	10,810
Dec.	7,837	1,786	968	375	10,966

Stocks

1949	77,731	4,654	12,224	3,433	98,042
1950	36,942	5,733	7,243	2,840	52,758
1951	105,271	8,379	12,481	3,821	129,912
1952	83,861	8,535	22,716	3,875	118,987
1953	135,153	11,480	24,866	4,346	175,845
1954	115,499	11,349	19,267	4,280	150,395
1955	108,136	11,971	10,223	5,300	135,630
1955					
Jan.	114,976	11,598	17,079	4,160	147,813
Feb.	111,796	10,555	15,424	3,885	141,660
Mar.	113,594	11,037	15,096	3,786	143,513
Apr.	112,156	10,863	14,813	3,612	141,444
May	109,381	10,283	14,449	3,995	138,108
June	103,844	9,755	13,053	4,042	130,694
July	110,281	11,213	13,288	5,120	139,902
Aug.	108,211	11,326	12,395	5,118	137,050
Sept.	107,746	11,209	12,190	4,995	136,140
Oct.	105,746	11,820	12,146	5,041	134,753
Nov.	105,287	11,530	11,646	5,201	133,664
Dec.	108,136	11,971	10,223	5,300	135,630

Source: U. S. Department of Commerce.

Natural and Synthetic Rubber Latex in the United States

(All Quantities in Long Tons)

New Supply

Year	Natural	GR-S	Neoprene	N-Type	Total Synthetic	Grand Total
1944	3,090	6,580	4,683	.....	11,263	14,353
1945	4,768	15,176	7,077	.....	22,253	27,021
1946	8,012	24,810	13,595	.....	38,405	46,417
1947	17,675	22,474	6,089	.....	28,563	46,238
1948	32,630	21,494	5,022	.....	26,516	59,146
1949	29,974	21,357	3,651	.....	25,008	54,982
1950	54,401	31,339	5,725	.....	37,064	91,465
1951	54,963	32,972	6,866	2,948	42,786	97,749
1952	48,228	42,273	7,598	4,164	54,035	102,263
1953	75,511	48,112	9,026	5,844	62,982	138,493
1954	74,483	48,379	8,214	6,866	63,459	137,942
1955	86,390	69,394	10,432	10,798	90,594	176,984
1954:						
Dec.	8,888	5,238	729	624	6,591	15,479
1955:						
Jan.	7,853	6,199	617	624	7,440	15,293
Feb.	6,110	5,634	797	641	7,072	13,182
Mar.	7,611	7,078	854	672	8,604	16,215
Apr.	8,550	5,680	975	1,022	7,677	16,527
May	8,849	5,292	880	808	6,980	15,829
June	7,736	4,688	905	1,434	7,027	14,763
July	8,702	4,753	641	993	6,387	15,089
Aug.	8,885	4,456	881	917	6,254	15,139
Sept.	8,109	5,698	994	1,086	7,778	18,887
Oct.	6,900	6,231	922	883	8,036	14,936
Nov.	7,085	6,933	1,004	781	8,718	15,803
Dec.	6,018	6,407	962	874	8,243	14,261

Consumption[1]

1944	6,085	6,000	4,400	....	10,400	16,485
1945	3,886	14,500	6,800	....	21,300	25,186
1946	5,714	23,500	13,000	....	36,500	42,214
1947	13,909	22,500	6,500	....	29,000	42,909
1948	28,489	21,500	5,250	....	26,750	55,239
1949	36,117	21,500	3,750	....	25,250	61,367
1950	56,138	31,000	5,500	....	36,500	92,638
1951	46,750	31,031	6,279	2,628	39,938	86,688
1952	53,567	40,562	7,368	3,093	51,023	104,590
1953	67,375	46,473	7,981	3,654	58,108	125,483
1954	75,931	44,173	7,251	4,507	55,931	131,862
1955	83,807	61,327	8,787	6,546	76,660	160,467
1954:						
Dec.	7,671	4,575	600	460	5,635	13,306
1955:						
Jan.	7,355	4,537	661	506	5,704	13,059
Feb.	7,066	4,881	689	501	6,071	13,137
Mar.	8,415	5,861	828	509	7,198	15,613
Apr.	7,732	5,209	748	601	6,558	14,290
May	6,643	4,728	768	493	5,989	12,632
June	6,589	4,885	722	587	6,194	12,783
July	5,469	3,830	535	626	4,991	10,460
Aug.	6,784	4,514	770	810	6,094	12,878
Sept.	7,452	5,505	730	878	7,113	14,565
Oct.	7,209	5,704	739	614	7,057	14,266
Nov.	6,620	5,954	829	603	7,386	14,006
Dec.	6,473	5,719	768	538	7,025	13,498

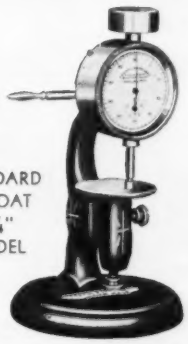
Stocks at End of Period

1944	2,443	....	....	....	....	2,443
1945	3,121	....	....	....	....	3,121
1946	4,865	....	....	....	....	4,865
1947	5,033	....	....	....	....	5,033
1948	11,235	....	....	....	....	11,235
1949	5,063	....	....	....	....	5,063
1950	4,927	....	....	....	....	4,927
1951	4,752	3,727	1,245	532	5,504	10,256
1952	6,201	5,040	1,019	902	6,961	13,162
1953	13,532	4,794	1,117	721	6,632	20,164
1954	11,133	5,134	1,087	811	7,032	18,165
1955	12,645	6,357	1,155	1,248	8,760	21,405
1954:						
Dec.	9,933	5,134	1,087	811	7,032	16,965
1955:						
Jan.	9,684	5,861	1,067	812	7,740	17,424
Feb.	8,619	5,753	879	663	7,295	15,914
Mar.	7,820	6,940	909	637	8,486	16,306
Apr.	6,790	7,098	786	703	8,587	15,377
May	8,854	7,021	767	817	8,605	17,459
June	9,788	6,645	817	883	8,335	18,123
July	11,934	6,950	850	1,397	9,197	21,131
Aug.	11,962	6,201	885	1,319	8,405	20,367
Sept.	12,595	6,448	975	1,527	8,950	21,545
Oct.	12,156	5,798	1,075	1,196	8,069	20,225
Nov.	12,616	6,307	1,089	1,174	8,570	21,186
Dec.	12,645	6,357	1,155	1,248	8,760	21,405

Source: U. S. Department of Commerce.
Note: (1) GR-S and Neoprene consumption estimated through 1950.

RANDALL & STICKNEY

THICKNESS GAUGES FOR RUBBER



STANDARD THROAT 1¾" MODEL

THROAT DEPTHS
1¾" to 26"

FOOT TENSIONS
supplied by Internal Spring or Direct Weights

FOOT DIAMETERS
⅛" to 1¼"

ROLLS
Table and Roll or two Rolls

RANGE
½" or 1", also 1 CM Metric

26" DEEP THROAT MODEL

SEND FOR CIRCULARS to Dept. A.

FRANK E. RANDALL CO., Inc.
248 Ash St., Waltham 54, Mass., U.S.A.

Thomaston TEXTILES for the RUBBER INDUSTRY

THOMASTON Fabrics SINCE 1900

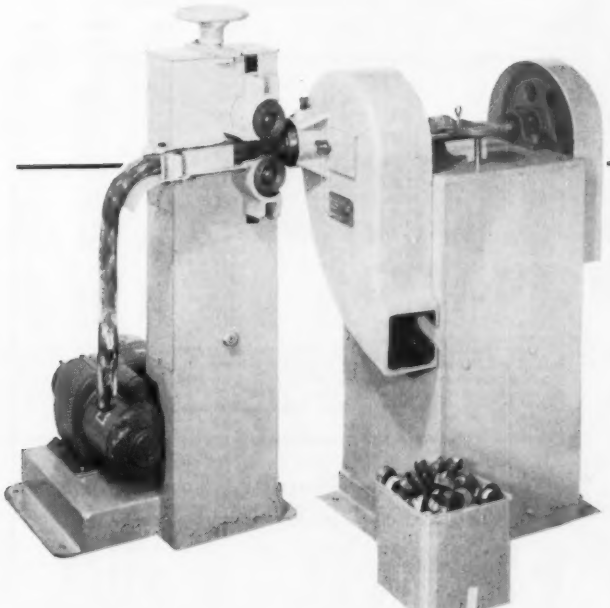
specifically engineered to meet your needs

TIRE FABRICS • HOSE AND BELT DUCKS
CHAFERS • YARNS • THREADS • CORDAGE
SHEETINGS • COATING FABRICS
DIVERSIFIED COTTON FABRICS

Other Available Facilities:
Bleaching, Dyeing, Finishing, Sewing

Thomaston Mills

THOMASTON, GEORGIA • NEW YORK OFFICE: 40 WORTH STREET
AKRON, OHIO OFFICE: 308 AKRON SAVINGS AND LOAN BUILDING



Slug Cutter with variable speed power feed attachment

SALES REPRESENTATIVE:

RALPH B. SYMONS ASSOCIATES, INC.
3571 Main Road, Tiverton, Rhode Island

RUBBER SLUG CUTTER

Report on Weight Tolerance from a User of the GOODMAN Rubber Slug Cutter . . .

"With a skilled operator and good extrusions, this machine will consistently hold plus or minus one gram on uncured rubber slugs one inch in diameter by one inch long."

This precision, plus high capacity, spells out production economies rarely found in rubber slug cutters.

Write for specification data sheet.

G. F. GOODMAN & SON

401 RICHMOND STREET, PHILADELPHIA 25, PA.

Machinery for the Rubber Industry

Rubber Industry Employment Earnings and Hours

All Rubber Products

Mo.	1954 Production Workers (thousands)	1954 Average Weekly Earnings	1954 Average Weekly Hours	1954 Average Hourly Earnings	1955 Production Workers (thousands)	1955 Average Weekly Earnings	1955 Average Weekly Hours	1955 Average Hourly Earnings
Jan.	203.8	$74.69	38.7	$1.93	208.5	$83.84	41.3	$2.03
Feb.	200.5	75.08	38.9	1.93	209.4	84.25	41.3	2.04
Mar.	196.6	74.31	38.5	1.93	211.6	83.64	41.0	2.04
Apr.	192.4	74.88	38.8	1.93	210.9	86.53	41.8	2.07
May	194.2	77.81	39.7	1.96	215.7	87.36	42.0	2.08
June	195.6	79.60	40.2	1.98	219.0	88.83	42.3	2.10
July	171.0	76.44	39.4	1.94	215.7	86.32	41.3	2.09
Aug.	174.9	75.85	39.1	1.94	216.8	86.32	41.3	2.09
Sept.	196.3	77.42	39.3	1.97	223.1	86.74	41.5	2.09
Oct.	201.6	81.20	40.4	2.01	226.3	89.25	42.1	2.12
Nov.	202.1	83.02	41.1	2.02	231.4	....	....	....
Dec.	206.8	84.85	41.8	2.03	....	....	....	....
Tires and Tubes								
Jan.	84.5	82.88	37.5	2.21	85.3	97.41	41.1	2.37
Feb.	82.9	83.03	37.4	2.21	86.5	96.46	40.7	2.37
Mar.	81.9	80.99	36.6	2.21	87.4	95.51	40.3	2.37
Apr.	80.4	84.14	37.9	2.22	88.6	102.18	42.4	2.41
May	81.1	88.65	39.4	2.25	89.8	101.88	42.1	2.42
June	82.2	92.06	40.2	2.29	91.0	105.60	43.1	2.45
July	65.2	87.01	38.5	2.26	91.5	103.33	42.7	2.42
Aug.	65.9	85.65	37.4	2.29	91.0	102.72	42.1	2.44
Sept.	82.6	86.18	38.3	2.25	91.9	101.02	41.4	2.44
Oct.	83.9	90.39	39.3	2.30	92.3	104.23	42.2	2.47
Nov.	81.2	94.54	40.4	2.34	....	....	....	....
Dec.	84.5	98.18	41.6	2.36	....	....	....	....
Rubber Footwear								
Jan.	21.5	62.98	38.4	1.64	22.1	68.97	40.1	1.72
Feb.	20.5	65.57	39.5	1.66	21.5	69.72	40.3	1.73
Mar.	19.6	65.51	39.7	1.65	21.5	69.72	40.3	1.73
Apr.	19.2	63.58	38.3	1.66	21.3	70.82	40.7	1.74
May	19.8	65.46	39.2	1.67	21.3	70.07	40.5	1.73
June	19.8	67.30	40.3	1.67	21.6	71.34	41.0	1.74
July	20.1	68.45	40.5	1.69	21.8	70.99	40.8	1.74
Aug.	20.5	66.40	40.0	1.66	21.5	67.25	39.1	1.72
Sept.	21.0	66.08	39.1	1.69	23.5	67.60	39.3	1.72
Oct.	21.9	71.34	41.0	1.74	24.5	69.20	40.0	1.73
Nov.	22.3	71.51	41.1	1.74	....	....	....	....
Dec.	22.3	71.69	41.2	1.74	....	....	....	....
All Other Rubber Products								
Jan.	97.8	70.62	39.9	1.77	101.1	76.08	41.8	1.82
Feb.	97.1	70.40	40.0	1.76	101.4	76.86	42.0	1.83
Mar.	95.1	70.22	39.9	1.76	102.7	76.49	41.8	1.83
Apr.	92.8	69.30	39.6	1.75	101.0	76.54	41.6	1.84
May	93.3	70.98	40.1	1.77	104.6	78.68	42.3	1.86
June	93.6	70.98	40.1	1.77	106.4	77.93	41.9	1.86
July	85.7	70.62	39.9	1.77	102.4	74.37	40.2	1.85
Aug.	88.5	77.15	40.2	1.77	104.3	75.85	41.0	1.85
Sept.	92.7	72.36	40.2	1.80	107.7	78.96	42.0	1.88
Oct.	95.8	74.98	41.2	1.82	109.5	80.56	42.4	1.90
Nov.	98.6	75.71	41.6	1.82	....	....	....	....
Dec.	100.0	76.44	42.0	1.82	....	....	....	....

Source: U. S. Department of Labor.

Note: Data are based upon reports from cooperating establishments covering both full and part-time employees who work during, or received pay for, any part of the pay period ending nearest the 15th of the month. These employment series have been adjusted to first quarter 1954 benchmark levels indicated by data from government social insurance programs. Hours and earnings data pertain only to production and related workers.

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market—in Cents)

Average Monthly Price Per Pound

	1949	1950	1951	1952	1953	1954	1955	1956
Jan.	33.37	31.89	45.04	42.96	33.24	34.15	35.07	35.24
Feb.	33.41	32.79	(a)	41.64	33.76	35.00	35.04	36.26
Mar.	33.44	32.65	46.06	41.70	34.10	35.23	34.33	....
Apr.	33.84	33.23	46.06	41.79	33.85	35.22	34.23	....
May	33.73	33.64	46.06	39.98	34.30	35.34	34.80	....
June	33.56	34.61	46.06	41.31	34.11	35.17	34.83	....
July	32.99	38.11	46.21	40.37	34.20	35.37	34.61	....
Aug.	32.06	38.93	35.93	40.42	33.82	35.19	34.53	....
Sept.	30.94	41.62	36.20	39.75	33.69	35.46	33.85	....
Oct.	30.32	40.66	38.13	37.52	33.53	35.24	33.93	....
Nov.	30.52	43.11	42.70	35.59	33.60	34.80	34.87	....
Dec.	31.08	43.37	43.32	33.76	33.52	35.03	34.95	....
Average for Year	32.44	37.05	42.43	39.71	33.81	35.10	34.59	....

Note: The Government established a ceiling price of 45.76c for spot cotton on March 3, 1951. (a) Trading suspended during February.

Production Index for the Rubber Industry

(1947-1949 = 100)

(Based on man-hours)

	1953	1954	1955		1953	1954	1955
Jan.	132	114	145	July	114	85	121
Feb.	140	114	144	Aug.	122	94	133
Mar.	143	118	146	Sept.	122	118	144
Apr.	140	116	147	Oct.	127	132	155
May	137	118	146	Nov.	120	124	150
June	131	121	151	Dec.	111	128	...

Sales by the Rubber Industry

(in Millions of Dollars*)

	1953	1954	1955		1953	1954	1955
Jan.	434	361	424	July	460	393	471
Feb.	442	360	440	Aug.	424	352	456
Mar.	452	378	466	Sept.	414	346	456
Apr.	443	382	445	Oct.	405	346	447
May	443	378	465	Nov.	360	404	482
June	442	385	465	Dec.	372	417	...

Rubber Manufacturers' Inventories

(in Millions of Dollars*)

	1953	1954	1955		1953	1954	1955
Jan.	839	835	790	July	901	787	853
Feb.	839	848	782	Aug.	888	754	863
Mar.	854	844	805	Sept.	899	799	874
Apr.	857	813	784	Oct.	878	835	902
May	868	798	810	Nov.	865	811	935
June	893	817	850	Dec.	859	821	...

Source: U. S. Department of Commerce.
Notes: * Adjusted for seasonal variation.

No. 1 R.S.S.—Annual Average Prices

(New York Market—Cents per Pound)

Year	High	Low	Avg.	Year	High	Low	Avg.
1914	93	56	65.33	1935	13¾	10½	12.37
1915	79	58½	65.85	1936	23	13½	16.41
1916	102	55	72.50	1937	26⅞	14	19.39
1917	90	52	72.23	1938	17⅞	10¼	14.64
1918	70	40	60.15	1939	24	14⅛	17.57
1919	57	38½	48.70	1940	24	18¼	20.10
1920	56½	16	36.30	1941	24⅞	19¼	22.40
1921	21¼	11½	16.36	1942	22½	22½	22.50
1922	28¾	13⅝	17.50	1943	22½	22½	22.50
1923	37½	24¾	29.45	1944	22½	22½	22.50
1924	40⅞	17⅜	26.20	1945	22½	22½	22.50
1925	121	34⅜	72.46	1946	22½	22½	22.50
1926	88½	36¾	48.50	1947	25	14	20.00
1927	41¾	33	37.72	1948	25	18	21.99
1928	41¾	17	22.48	1949	19¾	15⅞	17.57
1929	26⅜	15½	20.55	1950	86	18	41.10
1930	16½	7½	11.98	1951	76	52	(a)
1931	8⅝	4¼	6.17	1952*	33	26½	29.15
1932	4¾	2½	3.49	1953	31⅜	19⅞	24.21
1933	9⅞	2⅞	5.96	1954	34½	19½	23.61
1934	15⅞	8¾	12.92	1955	52	29⅜	39.16

Note: Price was fixed by Government on August 6, 1941, at 22½c a pound for non-war uses. Free trading was resumed May 1, 1947. (a) Free trading suspended March 31, 1951. GSA selling price ranged between 52 and 66c during balance of year. * Free trading was resumed on July 1, 1952; figures represent only July through December, 1952.

No. 1 R.S.S.—Monthly Average Prices

(New York Market—Cents per pound)

	1949	1950	1951	1952	1953	1954	1955	1956
Jan.	19.23	18.33	71.21	....	29.40	20.22	33.92	41.70
Feb.	18.49	19.40	73.61	....	27.57	19.98	34.90	36.46
Mar.	19.08	19.86	72.05	....	26.59	20.16	31.08	....
Apr.	18.53	23.51	....	....	24.66	22.06	31.75	....
May	17.92	28.07	....	....	25.52	21.96	31.35	....
June	16.36	30.92	....	....	24.42	23.01	34.74	....
July	16.45	39.10	....	30.52	23.64	24.12	40.84	....
Aug.	16.60	51.63	....	29.36	23.36	23.26	45.85	....
Sept.	17.58	55.98	....	27.42	23.06	23.99	48.27	....
Oct.	16.31	62.19	....	27.26	20.82	26.57	43.81	....
Nov.	16.70	73.05	....	29.25	20.58	28.07	44.95	....
Dec.	17.53	71.20	....	31.26	20.92	29.88	48.40	....
Average for Year	17.57	41.10	(a)	29.15	24.21	23.61	39.16	....

Note: (a) Free trading suspended March 31, 1951, and resumed on July 1, 1952.

USE
Progressive
LONG LIFE
PRECISION

CUTTING DIES

FOR GREATER EFFICIENCY

BEFORE

AFTER

Manufacturers of Rubber and Plastic Products who demand dies of precision quality and long life, will be pleased with the PROGRESSIVE way.

For all jobs—whether by hand or machine.

Mallet Dies—Walker Dies.

Clicker Dies

Special Dies for special problems such as for removing flashings left after molding process.

Western RMH — Knight — Freeman and all other machine dies.

Distributor: Famous Renco Cutting Pads and Blocks.

We also manufacture screw machine parts.

Estimates gladly furnished.

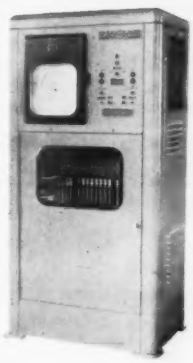
PROGRESSIVE *service co.*

Main Office and Factory
2743 LOCUST ST.
ST. LOUIS, MO.
Tel. JEFFERSON 1-4300

Branch Office and Factory
82 S. CAMERON ST.
HARRISBURG, PA.
Tel. CEDAR 6-9329

38 YEARS EXPERIENCE

for PRODUCTION and LAB TESTING



B. F. GOODRICH-

CORD TENSION VIBRATOR

New modernized design with highly accurate dependable, electric black oven for testing modern cards.

For Cotton, Rayon and Nylon

Exclusive Manufacturers

FERRY MACHINE CO., KENT, OHIO

Export Sales Through Binney & Smith, International

Trade Mark

HEVEATEX CORPORATION

78 GOODYEAR AVENUE

MELROSE 76, MASS.

BRANCHES: CHICAGO, ILL. AKRON, O. DETROIT, MICH. LOS ANGELES, CAL.

Natural and Synthetic

Latex and Latex Compounds

for all purposes

Automotive Pneumatic Casings

(Thousands of Units)

	Shipments					
	Original Equipment	Replacement	Export	Total	Production	Inventory End of Period
1946 (total)	15,310	65,490	1,512	82,312	82,298	2,448
Passenger Car	11,086	54,684	653	66,423	66,466	1,763
Truck and Bus	4,224	10,806	859	15,889	15,832	685
1947 (total)	25,056	62,871	3,256	91,183	95,550	6,949
Passenger Car	19,644	52,857	1,608	74,109	77,795	5,444
Truck and Bus	5,412	10,014	1,648	17,074	17,755	1,505
1948 (total)	26,845	49,148	1,787	77,781	81,314	10,698
Passenger Car	21,589	41,295	656	63,540	66,738	8,773
Truck and Bus	5,256	7,853	1,132	14,241	14,576	1,925
1949 (total)	31,584	43,466	1,467	76,517	76,369	10,638
Passenger Car	28,129	36,440	509	65,077	65,140	8,904
Truck and Bus	3,456	7,026	958	11,440	11,228	1,734
1950 (total)	41,349	56,808	1,430	99,587	92,754	3,794
Passenger Car	36,678	47,103	642	84,423	78,598	3,050
Truck and Bus	4,671	9,705	788	15,164	14,156	743
1951 (total)	32,153	44,612	1,677	78,442	83,405	8,765
Passenger Car	26,729	34,226	723	61,678	65,546	6,973
Truck and Bus	5,424	10,386	954	16,764	17,859	1,791
1952 (total)	29,484	54,342	1,520	85,346	90,411	14,110
Passenger Car	24,106	45,458	741	70,305	74,341	11,251
Truck and Bus	5,378	8,884	779	15,041	16,070	2,859
1953 (total)	37,949	55,124	1,543	94,617	96,150	15,720
Passenger Car	33,106	45,798	809	79,713	81,455	13,044
Truck and Bus	4,843	9,326	734	14,904	14,696	2,676
1954 (total)	33,333	55,155	1,753	90,241	89,141	14,762
Passenger Car	29,741	47,044	928	77,713	76,794	12,217
Truck and Bus	3,591	8,111	826	12,528	12,347	2,545
1955 (total)	47,374	59,246	1,879	108,499	112,178	18,778
Passenger Car	42,574	50,189	966	93,730	97,223	15,963
Truck and Bus	4,800	9,057	912	14,769	14,955	2,815
1955:						
Mar. (total)	4,780	4,926	201	9,907	10,083	15,609
Passenger Car	4,326	4,254	104	8,685	8,810	12,875
Truck and Bus	454	672	96	1,222	1,273	2,734
Apr. (total)	4,457	5,315	165	9,937	9,153	14,890
Passenger Car	3,967	4,677	89	8,733	8,000	12,197
Truck and Bus	489	639	76	1,204	1,153	2,692
May (total)	4,352	5,361	152	9,865	9,949	14,936
Passenger Car	3,871	4,705	87	8,663	8,742	12,235
Truck and Bus	481	656	65	1,202	1,208	2,701
June (total)	3,931	6,129	174	10,234	10,703	15,460
Passenger Car	3,482	5,399	97	8,979	9,383	12,698
Truck and Bus	449	730	76	1,255	1,320	2,763
July (total)	3,890	5,711	128	9,729	9,027	14,684
Passenger Car	3,461	4,802	76	8,339	7,893	12,199
Truck and Bus	429	909	51	1,389	1,134	2,485
Aug. (total)	3,362	5,980	119	9,462	8,717	13,908
Passenger Car	2,984	5,058	60	8,103	7,585	11,636
Truck and Bus	378	922	59	1,359	1,132	2,272
Sept. (total)	3,142	5,170	140	8,453	9,125	14,674
Passenger Car	2,749	4,366	74	7,189	7,882	12,407
Truck and Bus	393	804	66	1,264	1,242	2,267
Oct. (total)	3,495	4,460	161	8,117	9,555	16,163
Passenger Car	3,172	3,556	74	6,802	8,160	13,806
Truck and Bus	324	904	88	1,315	1,395	2,357
Nov. (total)	4,303	3,592	150	8,045	9,603	17,727
Passenger Car	3,900	2,902	63	6,865	8,198	15,142
Truck and Bus	403	690	87	1,180	1,405	2,585
Dec. (total)	4,045	3,298	172	7,515	8,478	18,778
Passenger Car	3,641	2,746	80	6,467	7,223	15,963
Truck and Bus	404	552	91	1,047	1,255	2,815

Source: The Rubber Manufacturers Association, Inc.

Automobile Production in U. S.

(Civilian Production Only)

Year	Passenger Cars	Trucks	Total
1936	3,669,528	781,862	4,451,390
1937	3,915,889	892,382	4,808,271
1938	2,000,985	485,852	2,486,837
1939	2,866,796	704,308	3,571,104
1940	3,692,328	721,637	4,413,965
1941	3,744,500	875,381	4,619,681
1942	220,814	133,083	353,897
1943	0	4,501	4,501
1944	0	124,819	124,819
1945	83,792	313,643	397,435
1955:			
Jan.	635,513	89,676	725,189
Feb.	677,705	67,061	744,766
Mar.	791,280	102,992	894,272
Apr.	753,434	127,887	881,321
May	721,139	127,941	849,080
June	647,658	119,215	766,873
1956:			
Jan.	635,513	89,676	725,189
Feb.	.....	.....	.....
Mar.	.....	.....	.....
Apr.	.....	.....	.....
May	.....	.....	.....
June	.....	.....	.....

Year	Passenger Cars	Trucks	Total
1946	2,148,699	930,760	3,079,429
1947	3,558,178	1,220,634	4,778,812
1948	3,909,270	1,363,856	5,273,126
1949	5,108,841	1,123,736	6,232,577
1950	6,665,836	1,332,263	7,998,099
1951	5,337,729	1,420,432	6,758,161
1952	4,320,794	1,212,790	5,533,584
1953	6,121,787	1,202,196	7,323,983
1954	5,558,897	1,038,045	6,596,942
1955	7,920,186	1,245,018	9,165,204
July	658,736	109,589	768,325
Aug.	620,610	95,119	715,729
Sept.	467,845	91,894	559,739
Oct.	505,177	95,610	600,787
Nov.	745,993	114,448	860,441
Dec.	695,096	103,586	799,092
July	.....	.....	.....
Aug.	.....	.....	.....
Sept.	.....	.....	.....
Oct.	.....	.....	.....
Nov.	.....	.....	.....
Dec.	.....	.....	.....

Source: Automobile Manufacturers Association.
Note: Figures are based on factory sales. Revisions are made from time to time in these figures and the latest issue should be consulted for accuracy.

Automotive Inner Tubes

(Thousands of Units)

	Shipments					
Year	Original Equipment	Replacement	Export	Total	Production	Inventory End of Period
1946	15,327	59,357	1,424	76,108	77,251	3,820
1947	25,046	46,560	2,483	74,088	79,181	8,059
1948	26,833	40,548	1,119	68,499	70,033	9,641
1949	31,521	31,450	887	63,858	65,114	10,657
1950	41,240	42,671	811	84,723	80,179	...
1951	32,151	32,284	1,071	65,507	67,249	10,094
1952	29,451	32,985	1,014	63,449	65,073	12,036
1953	37,957	36,072	878	74,907	74,425	11,874
1954	25,071	35,576	945	61,593	48,279	9,519
1955	5,001	33,387	1,001	39,389	35,900	6,833
1955:						
Mar.	491	2,732	105	3,327	3,234	8,217
Apr.	530	2,635	85	3,250	2,836	7,963
May	531	2,617	84	3,233	3,005	7,735
June	477	3,003	85	3,565	3,136	7,326
July	475	2,915	60	3,450	2,768	6,664
Aug.	394	3,269	70	3,733	2,923	5,917
Sept.	360	2,814	86	3,261	3,169	5,966
Oct.	319	2,595	89	3,004	3,119	6,286
Nov.	355	2,427	92	2,875	3,052	6,734
Dec.	305	2,289	93	2,686	2,719	6,833

Source: The Rubber Manufacturers Association, Inc.

Vinyl and Vinyl Copolymer Resins—Sales

(Thousands of Pounds—Resin Content)

	Polyvinyl Chloride and Copolymer Resins							All Other Vinyl Resins		
	Film	Sheeting	Molding & Extrusion	Textile & Paper Treating	Flooring	Protective Coatings	All Other Uses	Adhesives	All Other Uses	Grand Total
1953	63,691	62,385	129,215	52,353	22,152	22,823	27,790	22,411	77,478	480,299
1954	69,943	56,588	147,284	49,546	34,890	23,676	35,148	26,609	74,090	517,773
1954										
Sept.	5,665	4,340	13,454	3,784	3,797	2,242	3,779	2,379	5,768	45,208
Oct.	5,427	4,227	13,456	3,890	3,688	2,198	3,515	2,215	6,765	45,381
Nov.	6,857	4,132	14,057	4,537	4,099	2,131	3,653	2,235	7,318	49,019
Dec.	6,087	3,963	14,850	4,548	3,796	2,066	3,268	1,867	6,921	47,366
1955										
Jan.	6,291	4,455	15,441	4,512	4,341	2,288	3,600	2,576	7,705	51,208
Feb.	6,606	4,205	15,748	4,829	4,812	2,285	3,801	2,352	7,761	52,400
Mar.	8,052	4,429	16,102	5,402	5,208	2,815	4,336	2,859	8,865	58,068
Apr.	8,227	4,709	15,568	5,779	5,134	2,601	3,271	2,585	8,967	56,842
May	6,985	4,429	14,452	5,240	5,109	2,449	3,547	2,809	9,237	54,256
June	7,103	3,970	14,832	5,036	4,318	2,139	4,403	2,322	8,508	52,630
July	5,925	3,765	11,943	4,304	3,601	2,027	3,540	2,605	6,919	44,631
Aug.	6,478	3,359	13,265	5,136	4,599	2,105	4,759	2,868	8,799	51,367
Sept.	6,983	4,166	15,412	5,582	4,707	2,313	4,017	3,072	9,129	55,382
Oct.	7,498	4,581	16,067	6,043	5,369	2,290	6,318	2,670	9,836	60,672
Nov.	6,855	4,771	18,224	6,271	4,945	2,147	6,818	2,945	9,831	62,807

Source: Chemical Division, U. S. Tariff Commission.

Now . . . Up-To-The-Minute

INTERNATIONAL TECHNICAL ASSISTANCE

- To tire and other rubber manufacturers abroad who desire to learn the latest American "Know-How" . . . cut manufacturing costs — we offer comprehensive Technical Assistance at low cost.
- Dayton Rubber's I.T.A. plan has been in existence for 20 years. Rubber experts and teachers who give unexcelled technical assistance at a surprisingly nominal cost . . . all backed by 50 years of recognized leadership in the rubber industry . . . with 4 U. S. plants.
- We train your personnel in these modern plants . . . help you establish the latest formulae for processing natural and all new types of synthetic rubbers and textiles . . . latest "Know-How" in Tubeless Tires, Butyl Tubes, Rayon and Nylon Cords, Carbon Blacks. We also design factories and supervise machinery installations if desired. Write: International Technical Assistance Division, Dayton Rubber Co., Dayton 1, Ohio.

CABLE ADDRESS:
THOROBRED

I.T.A.

Dayton Rubber 51 YEARS OF PROGRESS

COMCO

MACHINERY & EQUIPMENT
for
THE PLASTICS INDUSTRY

EXTRUDERS—*For all purposes*
INJECTION MOLDING MACHINES—*All capacities*
COMPRESSION MOLDING MACHINES—*All sizes*
VINYL CASTING MACHINES—*Fully automatic*
VACUUM & SHEET FORMING PRESSES
COATING & LAMINATING EQUIPMENT
VINYL PRINTING & EMBOSSING SYSTEMS
BANDKNIFE FOAM SPLITTING MACHINES
WIRE INSULATING ASSEMBLIES
COATING AND FUSING TRAINS

Write, telephone, or wire inquiries.

CONTINENTAL MACHINERY CO., INC.
261 Broadway, New York 7, N. Y.
Telephone: Worth 2-1650 • Cable: CONTIMAC

The leading authority on rubber matters. Among the regular features are technical articles written by experts dealing with the various aspects of the growing of rubber, the manufacture of rubber products and other matters of vital interest to all sides of the industry.

Established in 1884, and with a world-wide circulation, it is the oldest paper in the world and the only weekly published in the English language devoted exclusively to the Rubber and Allied Industries.

Rubber Journal

The Organ of the Rubber and Allied Industries

Annual subscription (including postage):
United Kingdom, 30s. 0d.; Foreign, 35s, 0d.;
Index (half-yearly), 7s. 6d. per annum extra.

Specimen copy and advertising rates on application to the publishers:—

MACLAREN & SONS LTD
Stafford House, Norfolk Street, London, W.C.2.

Telegrams & Cables:
BUNS, PHONE, LONDON
Telephone: TEMple Bar 5273.
Codes: BENTLEY'S, BROOMHALL,
A.B.C. 5TH EDITION.

Various Compounding Materials Consumed by the Rubber Industry

Material	1947	1948	1949	1950	1951	1952	1953
Antimony, Primary:							
Short tons	39	41	55	103[c]	19[c]	66	20
% of total	.002	.003	.005	.007	.001	.004	.001
Asphalt: [a]							
Short tons	32,113	19,967	18,050	26,819	21,414	33,288	.....
% of total	0.7	0.4	0.3	0.3	0.3	0.4	.....
Barite (Barytes):							
Short tons	17,000	18,000	14,000	19,000	15,000	14,000	.....
% of total	3.1	2.85	2.53	3.31	2.13	2.0	.....
Carbon Black:							
Short tons	471,790	435,282	383,565	515,184	530,614	537,273	566,797
% of total	94.3	95.5	93.3	92.9	93.9	93.1	94.4
Clay, Kaolin:							
Short tons	166,201	176,965	197,341	263,306	231,331	240,982	.....
% of total	11.5	11.3	13.1	15.0	12.7	13.2	.....
Clay, Fire & Stoneware:							
Short tons	17,970	15,480	27,148	9,500	.....	9,322	.....
% of total	0.2	0.2	0.3	0.1	.....	0.1	.....
Lime:							
Short tons	589	1,154	715	908	1,126	2,000	.....
% of total	0.01	0.02	.0002	.0002	(d)	(d)	.....
Litharge:							
Short tons	2,205	2,835	1,398	3,047	2,641	2,109	.....
% of total	1.3	1.8	1.2	1.7	1.7	1.5	.....
Lithopone:							
Short tons	3,085	4,192	3,245	4,092	3,295	1,523	1,723
% of total	1.9	3.0	4.1	3.9	3.2	2.5	3.3
Mica, Ground:							
Short tons	3,900	4,372	3,856	5,776	6,551	5,126	.....
% of total	6.0	7.0	7.0	8.0	9.0	7.0	.....
Sulfur:							
Short tons	72,800	70,560	59,360	75,000	75,000	75,000	.....
% of total	1.8	1.7	1.5	1.3	1.6	1.6	.....
Talc: [b]							
Short tons	71,840	66,226	53,400	75,900	70,970	64,476	.....
% of total	13.9	13.0	12.0	12.0	11.2	10.9	.....
Zinc Oxide:							
Short tons	82,248	82,895	58,496	82,944	71,507	72,774	78,439
% of total	51.2	54.9	52.5	51.6	48.4	51.2	52.7

Source: U. S. Bureau of Mines.
Notes: (a) Solid and semi-solid products of less than 200 penetration. (b) Includes prophyllite and ground soapstone. (c) Does not include precipitated antimony sulfide as in previous years. (d) Negligible.

Reclaimed Rubber

(Including Natural and Synthetic)

(All Quantities in Long Tons)

Year	New Supply	Consumption: Tons	Consumption: % to Crude [a]	Exports	Stocks On Hand at End of Period
1938	122,400	120,800	27.6	7,403	23,000
1939	186,000	170,000	28.7	12,611	25,250
1940	208,971	190,244	29.3	11,347	32,636
1941	274,202	251,231	32.2	13,851	41,750
1942	286,007 [b]	254,820	64.6	30,405	42,532
1943	304,058 [c]	291,082	59.6	15,678	46,201
1944	260,631 [d]	251,083	35.3	11,800	43,832
1945	243,309	241,036	30.2	13,413	28,155
1946	295,612	275,410	26.5	14,461	33,666
1947	291,395	288,395	24.8	14,556	35,943
1948	266,861	261,113	24.4	11,428	32,630
1949	224,029	226,679	22.5	10,637	28,263
1950	314,008	303,733	24.1	11,740	35,708
1951	366,700	346,121	26.6	14,722	45,082
1952	274,981	280,002	22.2	11,180	30,664
1953	298,336	285,050	21.3	11,597	32,319
1954	258,101	249,049	20.2	10,232	30,746
1955	326,697	314,870	20.7	13,865	31,100
1955:					
Jan.	25,336	25,322	20.2	1,041	29,656
Feb.	25,444	24,333	20.5	1,085	30,125
Mar.	29,574	28,674	21.1	1,088	30,311
Apr.	26,817	26,609	21.3	1,088	30,068
May	27,911	27,652	21.2	1,056	29,528
June	30,451	29,157	21.5	1,128	29,725
July	24,114	22,563	20.6	1,176	29,939
Aug.	25,223	25,790	21.2	1,144	27,956
Sept.	26,512	26,340	20.6	1,018	27,110
Oct.	28,038	26,597	19.7	1,381	27,565
Nov.	29,124	27,229	20.3	1,313	28,473
Dec.	28,153	24,604	20.0	1,347	31,100

Source: U. S. Department of Commerce.
Notes: (1) These figures are revised from time to time and the latest available issue should be consulted for the most accurate data. (a) Includes natural and synthetic rubber. (b) Includes 893 tons of imports. (c) Includes 67 tons of imports. (d) Includes 21 tons of imports.

Cotton, Rayon and Nylon Tire Fabrics

(In Thousands of Pounds)

	Production: Rayon Tire Cord Not Woven	Production: Rayon Tire Cord Woven	Production: Cotton and Nylon Cord & Fabric [a]	Production: Chafer Fabrics (all fibers)	Production: Total Tire Cord and Fabric	Stocks [b]: Cotton and Nylon Cord & Fabric	Stocks [b]: Rayon Cord and Fabric
1954:							
Jan.-Mar.	17,297	73,068	7,905	13,228	111,499	n.a.	n.a.
Apr.-June	15,257	63,975	12,424	12,867	104,523	6,975	56,497
July-Sept.	12,851	50,136	8,858	9,321	81,166	7,321	47,572
Oct.-Dec.	14,609	76,931	13,081	12,476	117,097	7,654	47,061
Total	60,014	264,110	42,268	47,893	414,285	.....	.....
1955:							
Jan.-Mar.	20,299	79,191	14,870	12,763	127,123	6,863	44,239
Apr.-June	21,550	81,036	18,898	12,724	134,208	8,870	40,689
July-Sept.	20,740	81,996	16,093	12,941	131,770	9,679	47,272
Oct.-Dec.	24,343	77,600	15,754	12,333	130,030	9,182	46,636
Total	86,932	319,823	65,615	50,761	523,131	34,594	178,836

Source: Bureau of the Census, U. S. Department of Commerce.
Notes: (a) Combined to avoid disclosing figures for individual companies. (b) At end of period.

Gasoline Consumption

(In Thousands of Barrels of 42 Gallons)

	1948	1949	1950	1951	1952	1953	1954	1955
Jan.	61,308	63,125	66,981	80,670	86,863	89,634	89,852	96,397
Feb.	56,487	57,980	53,274	72,864	82,043	86,458	86,206	88,464
Mar.	68,171	73,282	78,780	86,962	87,065	98,158	101,549	105,684
Apr.	72,183	75,318	80,350	87,573	98,653	102,044	103,866	111,116
May	77,186	81,665	89,035	100,266	101,137	105,918	104,418	115,707
June	78,044	83,374	90,174	96,364	99,305	114,703	113,037	120,710
July	81,428	83,129	91,677	100,567	105,307	112,960	112,231	115,653
Aug.	80,351	84,707	94,507	101,453	102,954	109,124	110,223	121,816
Sep.	76,159	80,832	86,725	91,891	100,095	106,158	104,706	113,379
Oct.	75,164	79,327	89,067	100,209	103,689	106,037	105,607	112,558
Nov.	72,560	76,346	82,688	88,581	91,326	99,210	102,393	109,212
Dec.	72,162	75,628	81,032	84,551	95,817	100,225	104,258	.....
	871,270	913,713	994,290	1,091,951	1,154,254	1,230,629	1,238,346	.....

Source: U. S. Bureau of Mines.

U. S. Gross Imports of Balata, Jelutong, Gutta-Percha, etc.

(All Quantities in Long Tons)

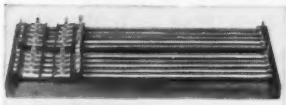
Year	Balata: Tons	Balata: Value	Jelutong: Tons	Jelutong: Value	Gutta-Percha & Other Guttas: Tons	Gutta-Percha & Other Guttas: Value
1944	1,012	660,805	88	45,578	10	4,999
1945	1,361	907,253	....	.....	36	21,970
1946	2,281	2,233,065	304	256,169	423	458,064
1947	1,982	2,276,531	2,878	1,496,887	392	779,591
1948	1,195	805,078	3,401	2,377,765	423	542,788
1949	1,391	814,554	1,043	834,978	197	189,021
1950	2,117	1,589,885	1,789	1,515,162	541	745,418
1951	2,452	1,973,271	1,669	2,608,359	383	430,539
1952	988	762,994	1,636	2,094,983	282	385,890
1953	1,619	866,248	1,027	1,166,837	235	303,116
1954	949	504,065	2,196	2,624,926	417	511,055
1954:						
Dec.	83	49,271	145	169,503	17	20,087
1955:						
Jan.	41	48,160	205	247,639	12	24,628
Feb.	28	24,321	129	102,572	37	36,566
Mar.	72	48,365	184	205,480	36	48,134
Apr.	83	58,184	113	122,952	36	32,463
May	44	35,402	121	119,278	52	48,021
June	93	61,821	119	115,511	46	50,901
July	105	66,771	146	163,189	17	16,588
Aug.	67	41,052	124	123,655	13	14,860
Sept.	151	181,535	97	105,884	10	9,295
Oct.	261	254,853	206	213,394	8	12,039

Source: U. S. Department of Commerce.

Gaps in Your Technical Library?
Contact the Book Department
RUBBER AGE
101 West 31st St., New York 1, N. Y.

TESTED is TRUSTED

PERMANENT SET TEST EQUIPMENT
For Cold Tension Recovery Test fulfilling Specifications MIL-C-12064 (CE).



One of the many Scott Testers* for "World Standard" testing of rubber, wire, textiles, plastics, paper, plywood up to 1 ton tensile.

SCOTT TESTERS
*Trademark

SCOTT TESTERS, INC.
85 Blackstone St., Providence, R. I.

THE NAME TO REMEMBER FOR PRECISION

McNEIL AKRON

Manufacturers of the World's Finest Rubber Curing Equipment

Mount Hope SYSTEM

PRECISION GUIDERS

Align Material accurately

Simple • Clean • Gentle • Automatic

Soft, rubber-like new MH-31 Rolls handle all materials.

Install individually or as an integral part of the Mount Hope System.

Write General Sales Manager for complete information.

MOUNT HOPE MACHINERY COMPANY

181 Fifth Street • Taunton • Massachusetts
Southern Repair Shop, Charlotte, N. C.

BOOKS for Technical Men

LATEX IN INDUSTRY by Royce J. Noble
PRICE: $15.00* (postpaid-U.S.)

RUBBER: NATURAL AND SYNTHETIC by H. J. Stern
PRICE: $12.00* (postpaid)

LATEX AND RUBBER DERIVATIVES—Vols. II & III by F. Marchionna
PRICE: $10.00* (postpaid)

ANNUAL BIBLIOGRAPHY OF RUBBER LITERATURE: 1946-1948 EDITION
PRICE: $7.50* (postpaid)

RECLAIMED RUBBER by John M. Ball
PRICE: $5.00* (postpaid-U.S.)

Available from RUBBER AGE
101 West 31st St., New York 1, N. Y.

* *Add 3% for New York City Addresses*

CLASSIFIED WANT ADS

RATES:
All Classifications (except Positions Wanted):
12c per word in light face type—Minimum, $5.00
18c per word in bold face type—Minimum, $5.00
Positions Wanted: (Light face type only)
$1.00 for 25 words or less; extra words, 5c each.
When Box Number is used, add 5 words to word count

Heading on separate line, $1.20 in light face; $1.80 in bold face.
Advertisements in borders: $20.00 per column inch; maximum, 85 words per inch.
All Classified Advertising must be paid in advance except for advertisers on contract. Send check with copy.
Replies to keyed advertisements will be forwarded to advertiser without charge.

Address all replies to Box Numbers care of RUBBER AGE, 101 West 31st St., New York 1, N. Y.

Copy for April, 1956 issue must be received by Friday, March 30th.

POSITIONS WANTED

PRODUCTION ENGINEER AVAILABLE. Experienced in mechanical and chemical sponge rubber production. Broad practical-technical knowledge. Capable as estimator, superintendent, compounder. University educated chemical-mechanical engineer. Midwest or far west location preferred. Address Box 588-P, RUBBER AGE.

SALES ENGINEER (Rubber Technologist) interested in position as technical representative chemicals, rubber, adhesives. Boston base. Have fifteen years experience selling industrial adhesives New England. Address Box 583-P, RUBBER AGE.

PRODUCTION SUPERVISIOR: Broad experience in all phases of manufacture of shoe soling and camelback, raw to finished product. Complete working knowledge of Banburys, calenders, tubers and presses. Address Box 596-P, RUBBER AGE.

LATEX CHEMIST: 15 years broad experience in emulsions and solvent adhesives for shoes, leather, handbags, fabrics, plastics, foil, paper products. Qualified in development, production, management. Some sales experience with customer contacts. Knows combining, laminating and pressure sensitive adhesives. Desires top level position or sales. Address Box 599-P, RUBBER AGE.

MANAGER for Production or Technical Director of Plant desires to relocate. Twenty years of intensive broad-practical-technical experience in large and medium sized plants. Have specialized in production of mechanical and chemical sponge rubber products. Capable estimtor, plants costs, director for low cost compounds, etc. Midwest location desired. Address Box 600-P, RUBBER AGE.

HELP WANTED

Chemical Supplier to Rubber and Latex Industries Overseas requires Technical Salesman. Compounding experience necessary. Overseas traveling required periodically. Excellent future prospects for right man. Office located in New York City. Address Box 558-W, RUBBER AGE.

Opening in laboratory of supplier of chemicals to rubber and plastics industries for man 30 or under with five years of general rubber compounding experience. Opportunity for advancement. Location—New England. Address Box 564-W, RUBBER AGE.

RUBBER CHEMIST OR COMPOUNDER
Preferably with rubber flooring and slab sole stock experience. Knowledge of vinyl compounding and processing would be desirable. Must be willing to relocate. Give complete biography, references and salary requirements. Address Box 565-W, RUBBER AGE.

TECHNICAL DIRECTOR
New and modern northern Ohio precision molded plant specializing in O-Rings, diaphragms, seals, etc., wants experienced compounder to head up both production and research. All replies confidential. Address Box 571-W, RUBBER AGE.

MARKETING OPPORTUNITIES in Sales and Sales Development for chemist or chemical engineer at B.S. level, preferable with background in rubber or polymer field. Write details to P. O. Box 216, TORRENCE, CALIFORNIA.

WANTED: CHIEF LATEX CHEMIST, unusual opportunity. One who can assume full responsibility for laboratory development of natural formulations. Concern located in New England. Replies confidential. Our employees know of this advertisement. Address Box 589-W, RUBBER AGE.

RUBBER CHEMIST, to take charge of laboratory in medium size footwear plant. Experienced only need apply. Give details of experience, education and salary requirements. All replies held confidential. Address Box 590-W, RUBBER AGE.

HELP WANTED—Continued

DEVELOPMENT CHEMIST wanted for laboratory control and research. This is an unusually good opportunity for a trained and ambitious man to become associated with a progressive rubber manufacturer located in the east. Replies to this ad will be held in strict confidence. Give complete resumé and salary requirements. Address Box 591-W, RUBBER AGE.

CLEVELAND CORPORATION SEEKS RUBBER CHEMIST. Recent graduate with chemical degree interested in obtaining practical experience in varied line of molded rubber products. Duties may ultimately include contacting customers with our rubber product problems. Address Box 592-W, RUBBER AGE.

CHEMISTS
CHEMICAL ENGINEERS
Indiana manufacturer of urethane foam has opportunities for young men in process and product development for positions having unusual growth prospects. Prefer men 25-35 years old, preferably with 2-3 years pilot or production experience. Supervisory experience desirable, but initiative and ability are of most importance.
Send details of experience and education.
Address Box 594-W, RUBBER AGE

CHEMICAL SALES: Excellent opportunity for well trained chemists having a varied industrial experience desiring to attain executive potential in sales field. Positions open offer an administrative position and one necessitating travel part time, but not on week ends. Reply in detail training, education, previous employment, and starting salary required. Address Box 598-W, RUBBER AGE.

CHEMIST-CHEMICAL ENGINEERS
"Positions with the better firms"

Experienced Rubber and Plastics Chemists—valve and pipe linings..... $12,000
Plastics Product Mgr.—molded design, compression molding technique essential. Potential partnership agreement $12,000

Call, write, or wire:—GLADYS HUNTING (Consultant)
DRAKE PERSONNEL, INC.
220 So. State St., Chicago 2, Ill., HArrison 7-8600

EXECUTIVE TECHNICAL SALES OFFICE
Nelson EMPLOYMENT SERVICE
specialist for the "Rubber Industry"
HAROLD NELSON — 653 FIRST NATIONAL TOWER
PHONE: PORTAGE 2-8801 — AKRON 8, OHIO

PERSONNEL SPECIALIST TO THE RUBBER INDUSTRY
Administrative,
Sales,
Technical and Production Supervision
Write or phone Leslie E. King, Manager Rubber and Technical Divs.
AKRON EMPLOYMENT SERVICE
Suite 607-08 Metropolitan Building, Akron, Ohio. PORtage 2-7641
Member: Chamber of Commerce, Ohio Private Employment Agencies Association and National Association of Personnel Consultants with 56 affiliate private agencies covering 26 states.

"Help Wanted" continued on next page

FLEXO JOINTS

THE STANDARD FOR SAFETY

• Proved in years of efficient service, FLEXO JOINTS offer the flexibility of hose — the strength of pipe — the ideal steam connection for presses, tire molds, etc.
Four styles, for standard pipe sizes ¼" to 3".
• Write for information and prices.

FLEXO SUPPLY CO., INC., 4662 Page Blvd., St. Louis 13, Mo.
S. A. ARMSTRONG, LTD.
In Canada: 1400 O'Connor Dr., Toronto 13, Ont.

HELP WANTED—Continued

LATEX CHEMIST: Must be experienced in compounding textile coatings. Knowledge of rug backing important. Salary open. Location Southeast. Address Box 601-W, RUBBER AGE.

VINYL CHEMIST

Leading flooring manufacturer in New Jersey has opening for chemist with experience in compounding and factory processing of vinyl resin. Experience in flooring preferred but not essential. Excellent opportunity for right man. Write giving details of education, experience and salary requirement. All replies confidential. Our employees know of this ad. Address Box 602-W, RUBBER AGE.

ASSISTANT PLANT ENGINEER

Permanent position for graduate mechanical engineer with some experience in rubber industry. To assist plant engineer in various phases of project engineering, maintenance, etc. A permanent career with a leading, well established rubber company, in New Jersey. Write giving details of education, experience, and salary required. All replies confidential. Our employees know of this ad. Address Box 603-W, RUBBER AGE.

PILLOW PLANT MANAGER
FOAM RUBBER

Take complete charge manufacture of foam rubber pillows. Must be thoroughly experienced. State qualifications. Good salary. Location East. Address Box 604-W, RUBBER AGE.

RUBBER CHEMIST

Chemist with compounding and molding experience in synthetic rubber, preferably in "O" rings, packings or mechanical rubber goods; knowledge of transfer molding process will be an advantage. Must relocate home in Dayton, Ohio area. State age, education, past employment record, marital status, address and phone number. Our employees know of this ad. Address Box 607-W, RUBBER AGE.

REMEMBER!

to show the box number on the envelope when writing to classified advertisers—that's the only way we can identify the advertiser to whom you are writing.

Address your letters to—

Box Number (show number)
c/o RUBBER AGE,
101 West 31st Street,
New York 1, N. Y.

GUMMI UND ASBEST

Covering the Rubber, Asbestos, and Synthetics Industries

Read by all important plant personnel in more than 13 European countries . . . the Advertising Medium of all firms interested in rubber imports and exports. Send for sample copy and advertising rates.

Annual Subscription (Including Postage) — $4.00

Representative in U.S.A. and Canada:
Frederic Popper, 993 Whittier Avenue, Akron 20, Ohio

A. W. GENTNER VERLAG
14a Stuttgart, Germany (American Zone)

Mold Lubricants

Silicones • Non-Silicones

We blend the mold lubricant to the job. Tell us your molding problems. We have a wide variety of standard lubricants from which to choose the one for your job.

Write today for technical data and price lists.

Stoner's Ink Company
Quarryville, Pa.

STEEL CALENDER STOCK SHELLS

ALL STEEL, ALL WELDED CONSTRUCTION, with forged steel hubs for 1¼", 1½" and 2" square bars. 4", 5", 6", 8", 10", 12", 15", 20" and 24" diameters. Any length.
Also Special Trucks (Leaf Type) Racks, Tables and Jigs, Used in manufacturing rubber and plastic products.

THE W. F. GAMMETER COMPANY
CADIZ, OHIO

Western Representative: FRED L. BROOKE CO., P.O. Box 463, Oak Park, Ill.
Ohio Representative: PALMER SUPPLIES CO., 2281 Scranton Road, Cleveland 13; 800 Broadway, Cincinnati 2,
Pacific Coast: ERWIN GERHARD, 40 California St., San Francisco 11, Calif.

BROOKLYN COLOR WORKS INC.,
MORGAN & NORMAN AVES., BROOKLYN 22, N.Y.

MICA

WATER-GROUND *"At its best"*
WHITE PURE UNIFORM

Warehouse stock in Chicago
Call: **Fred A. Jensen**
510 North Dearborn St.
Chicago 10, Illinois
Telephone: SUperior 7-3809

Send for Samples, and Prices

CONCORD MICA CORP.
Penacook, New Hampshire

Unique Colloidal Whiting
Economical Rubber
Re-enforcer

HAKUENKA

Special attention to Export Trade
SHIRAISHI KOGYO KAISHA, LTD.
Kitahama, Osaka, Japan

Directory of CONSULTANTS

R. R. OLIN LABORATORIES, INC.
(Established 1927)
Consultation—Development—Research for rubber and plastics industries and for raw materials suppliers for same.
P. O. Box 372RA — Akron (9), Ohio Tel HEmlock 4-3724

SOUTH FLORIDA TEST SERVICE
(Established 1931)
Corrosion, weathering and sunlight tests. Four locations in Southern Florida for inland, salt atmospheric, tidewater and total immersion exposure tests.
4201 N. W. 7th St., Miami, Florida

PHILIP TUCKER GIDLEY
Consulting Technologist—Research, product development, formulas, factory plans, engineering, chemical and physical testing.
Fairhaven, Massachusetts

HALE AND KULLGREN, INC.
Specialists in Process and Plants for Rubber and Plastics
A Complete Engineering Service: including: Economic Surveys; Process Design; Installation; Contracting and Operation.
613 E. Tallmadge Ave., Akron 10, Ohio

PIONEERS IN ELECTRON MICROSCOPY
For Fundamental Research, Production Control, and Advertising for Industry.
For full information without obligation, write:
Ladd RESEARCH INDUSTRIES, INC.
ROSLYN HEIGHTS, N. Y.

NATIONAL SHERARDIZING & MACHINE CO.
AIR BAG BUFFING MACHINERY
STOCK SHELLS HOSE POLES
MANDRELS
858 Windsor St., Hartford, Conn.
Representatives: Akron New York

HOWE MACHINERY CO., INC.
30 Gregory Avenue, Passaic, N. J.
DESIGNERS & BUILDERS
OF "V" BELT MANUFACTURING EQUIPMENT
Cord Latexing, expanding mandrels, automatic cutting skiving, flipping and roll drive wrapping machines.
ENGINEERING FACILITIES FOR SPECIAL EQUIPMENT
Call or Write

Granulated Cork
PROCESSED TO SPECIFICATION
MARYLAND CORK COMPANY, INC.
414 Baltimore Life Bldg. Charles & Saratoga Sts.
Baltimore 1, Maryland

MASTER BATCHING
&
COMPOUNDING
to your specifications
WASHINGTON RUBBER CO.
P.O. BOX 241 WASHINGTON, PA.

BUSINESS OPPORTUNITIES

CUSTOM MIXING, GRINDING and DISPERSION. Production time available on Rotary Cutters, Colloid Mills and explosion-proof Churns with attached filtering mediums. At your service—the technical know-how and completely equipped control laboratory. ADHESIVES & COATING SPECIALTIES, INC., Bldg. #22, 410 Frelinghuysen Ave., Newark 5, N. J.

FOR SALE: RUBBER—Pure Gum, 100 lb. rolls, ⅛" thick, unvulcanized. VICTORY HAT BLOCK CO., 53-57 West 36th Street, New York, N. Y. Phone: WIsconsin 7-4339.

FOR SALE: 4,400 pounds Loxite 9148 (Helizone Wax Dispersion) 55 gallon drums. Half original price, F.O.B. our plant. AMERICAN VISCOSE CORPORATION, Roanoke, Virginia.

BLACK
Master Batching
Mixing of all kinds
BESTREAD PRODUCTS CO. STOUGHTON, MASS.

MIXING
To Your Specification
K. B. C. INDUSTRIES, INC. NEW HAVEN, CONN.
881 State St. Tel: State 7-5662
Otto J. Lang, General Manager

Custom
BANBURY OR MILL MIXING
and
CALENDERING OF RUBBER AND PLASTICS
LIGHT COLORED STOCKS A SPECIALTY
Phone: Milford, Mass., 1870
ARCHER RUBBER COMPANY
Milford, Mass.

Custom Mixing RUBBER-PLASTICS
We do milling and compounding of all types—black or color—master batches
All mixing done under careful supervision and laboratory control.
Phone: Butler 9-0400

Pequanoc Rubber Co.
MANUFACTURERS OF RECLAIMED RUBBER
MAIN SALES OFFICE and FACTORY: BUTLER, N. J.

MISCELLANEOUS

WANTED: Copy of Monograph "Chemistry and Technology of Rubber" by Davis and Blake. Write price and condition. Address Box 595-M, RUBBER AGE.

EQUIPMENT WANTED

WANTED BY MANUFACTURER: Laboratory mill, 6″ x 12″ or similar in good working condition. Cash F.O.B. location. Address Box 593-E, RUBBER AGE.

WANTED: No. 3A Banbury Mixer and Mixing Mill 22″ and 20″ x 60″. Address Box 605-E, RUBBER AGE.

WANTED: Presses, 250 ton, 38″ vertical opening, 20″ strokes, 18″ diameter, double cavity opening. Address Box 606-E, RUBBER AGE.

PLANTS FOR SALE

FABRIC COATING PLANT FOR SALE: Knife coater for 60″ webs with drying oven and Chromalox fusion chamber. Embosser, rewind equipment, mills and mixers for preparing organosols and plastisols. Plant now in operation but needs capital and personnel to develop broad markets for present products. New York Area. Address Box 597-B, RUBBER AGE.

EQUIPMENT FOR SALE

Hydraulic presses and pumps rebuilt, repaired. New presses from laboratory up to 1000 tons. Pumping units up to 10,000 p.s.i., all capacities. CLIFTON HYDRAULIC PRESS CO., 290 Alwood Rd., Clifton, New Jersey.

FOR SALE: 4—336 cu. ft. (12,000#) Sprout Waldron Spiral Ribbon Mixers. 2—W & B 100 gal. Sigma Blade Jacketed Mixers. 3—Read 50 gal., 30 HP Sigma Blade Jacketed Mixers. Fitzpatrick Comminuting Machines, Models D, K & F. Mikro Pulverizers, #2TH, #2DH, #3TH. Large stock Steel and Stainless Steel Kettles. We need your surplus equipment. PERRY EQUIPMENT CORP., 1409 N. 6th Street, Philadelphia 22, Penna.

FOR SALE: 1—National-Erie 8½″ strainer; 1—#9 Banbury mixer; 1—6 x 12″ lab rubber mill; 1 Bolling hydraulic bale cutter; 1—Adamson 40″ mill, 50 HP; also vucanizers, presses, calenders, mixers, etc. CHEMICAL & PROCESS MACHINERY CORP., 52 Ninth Street, Brooklyn 15, N. Y. Phone: HYacinth 9-7200.

HYDRAULIC PRESSES

R. D. WOOD 2500 ton, 8-opening, 84″ x 54″ steam platens.
R. D. WOOD 2500 ton, single opening, down-acting, 92″ x 204″ bed.
ELMES 1000 ton hobbing, MD pump.
BIRDSBORO 882 ton, down-acting, 48″ x 48″ bed, self-contained.
HPM 750 ton, down-acting, 59″ x 44″ bed, self-contained.
FARREL 625 ton, 52″ x 52″ platens, self-contained.
WATSON-STILLMAN 600 ton, hobbing, MD pump.
FARREL 393 ton, 2-opening, 48″ x 48″ steam platens.
ELMES 350 ton, down-acting, 30″ x 36″ bed, self-contained.
LAKE ERIE, 215 ton, 36″ x 36″ platens, self-contained, semi-automatic.
CAREY 150 ton, 21″ x 16″ platen, adj. DLO 8″-28″ (3).
FARQUHAR 100 ton, down-acting, 30″ x 28″ bed, self-contained.
FARQUHAR 100 ton, drawing, down-acting, 29″ x 34″ bed, high speed, self-contained.
WATSON-STILLMAN 100 ton, down-acting, 22″ x 20″ bed, self-contained.
WATSON-STILLMAN 100 ton, BURROUGHS 75 ton, HPM 35 ton molding presses.
WATSON-STILLMAN and ELMES 30 ton and 20 ton lab presses.
STOKES model 200D-2, 15 ton automatic and STOKES 300, 200, 150 and 100 ton semi-automatic molding presses, all self-contained.

INJECTION MACHINES

DE MATTIA, model B, 24 oz.
HPM, model 350-H-16, 16 oz.
REED-PRENTICE, 12 oz., 1952 machine.
HPM 200-H-9, 9 oz. (2)
REED-PRENTICE ,8-oz.
IMPCO, 8 oz., vertical, late model.
WATSON-STILLMAN, 2 oz.
VAN DORN, Model H-200, 1 oz. and 2 oz.

TABLET MACHINES

STOKES S-5, RD-4, RDS-3, R and T; COLTON #5½, #5, #2-RP and #3-RP KUX 64

EXTRUDERS

ROYLE Nos. 1, 3 and 4; ALLEN-WILLIAMS 8″—all individual motor drive.

MILLS

4—FARREL 18″ x 50″; 4—FARREL 16″ x 40″; 2—FARREL 15″ x 36″—available as mill lines or as individual units.

ROTARY CUTTERS

CUMBERLAND No. O, 2 HP MD, BALL & JEWELL 1 HP MD, stainless and plain.
MISCELLANEOUS: Vulcanizers, Grinders, Pumps, Valves, Platens, etc.

JOHNSON MACHINERY COMPANY
683-R Frelinghuysen Avenue — Newark 5, New Jersey
BIgelow 8-2500
WHAT HAVE YOU FOR SALE? WHAT ARE YOU LOOKING FOR?

"Equipment for Sale" continued on next page

2—18 x 40″ mills with motor and reducer
2—14 x 36″ mills with motor and reducer
1—16 x 42″ mill with motor and reducer
1—750 ton hydraulic press—26″ ram
4—400 ton hydraulic presses—14″ ram
New 6 x 12″ laboratory mills

Various size rubber mills in stock.
Various size hydraulic presses in stock.
We specialize in rebuilding rubber and plastics machinery.
Buying and Selling.

Reliable
RUBBER & PLASTIC MACHINERY CO., INC.
2014 UNION TURNPIKE NORTH BERGEN, N. J.
PHONE: UNION 5-1073

How to Keep POSTED

In rubber, there's an easier way. Be sure to have your own subscription to RUBBER AGE and you won't have to wait weeks for the plant copy to reach you.

RUBBER AGE is such an important tool of your business, you should get maximum value from every issue . . . and that means seeing it while it is still current!

Fill in and mail the coupon below. Do it today, now, while it's fresh in your mind.

Rates in US: One year, $5; 2 years, $7.50; 3 years, $10

Please enter my subscription to RUBBER AGE for one year starting with the next issue.

☐ **Check enclosed** ☐ **Bill me**

Name _____
Title _____
Company _____
Street _____
City and State _____
Please check whether address is:
☐ **Company or** ☐ **Home**

Return to **RUBBER AGE** 101 W. 31st St., New York 1, N. Y.

356

AKRON RUBBER MACHINERY CO., INC.

200 S. Forge St. — AKRON 9, OHIO — Phone HE 4-9141

"ARMACO"

We are one of the foremost specialists in supplying used, reconditioned, and new machinery for the Rubber and Plastic industries only. NEW—Laboratory mills, hydraulic presses, extruders, bale cutters, and vulcanizers. We are interested in purchasing your surplus machinery or complete plant.

"ARMACO"

EQUIPMENT FOR SALE—Continued

FOR SALE: 1—new 3-roll 6″ x 16″ laboratory calender, m.d.; 1—Ball & Jewell rotary cutter, Model O, m.d.; 1—6″ x 12″ laboratory mill, m.d.; 2—Baker-Perkins size 15, 100-gallon jacketed mixers; 5—horizontal dry powder ribbon mixers, 400#, 1500#, 500#; 1—Fitzpatrick "D" comminutor, s.s. contact parts jacketed; 1—Mikro-Pulverizer #2TH, with motor; 4—Reed-Prentice & WS injection molding machines, two 16 oz.; also other sizes Hydraulic Presses, Tubers, Banbury Mixers, Mills, Vulcanizers, Calenders, Pellet Presses, Cutters. WANTED: Your Surplus Rubber Machinery. CONSOLIDATED PRODUCTS COMPANY, INC., 70 Bloomfield St., Hoboken, N. J. HOboken 3-4425; N. Y. Phone: BArclay 7-0600.

NEW ARRIVALS FOR SALE: French Oil Mill Machinery Compression Molding Presses, 50-170 tons; Wood 20″ x 20″ 12″ ram 170 tons; Southwark 24″ x 24″ 12″ ram, 170 tons; Baldwin Southwark 4—26″ x 26″ 8″ rams, 75 tons; 5—26″ x 26″ 7″ rams 57.7 tons; 2—15″ x 15″ 8″ rams 75 tons; 2—19″ x 24″ 10″ ram, 78 tons; 2—12″ x 12″ 7½″ rams 66 tons; 2—D&B 12″ x 12″ 7″ rams, 57.7 tons; 8″ x 9″ 4½″ rams, 24 tons; D&B 12″ x 12″ 3″ rams, 10 tons; HPM Transfer Molding 75 tons; Preform Presses, Colton 5½ T Stokes R and DDS-2 MD; New Universal Dual Pumping Units 3-15 HP; Laboratory Mills and Calenders, also extruders, mixers, vulcanizers, injection molding units, etc. UNIVERSAL HYDRAULIC MACHINERY CO., INC., 285 Hudson Street, New York 13, N. Y.

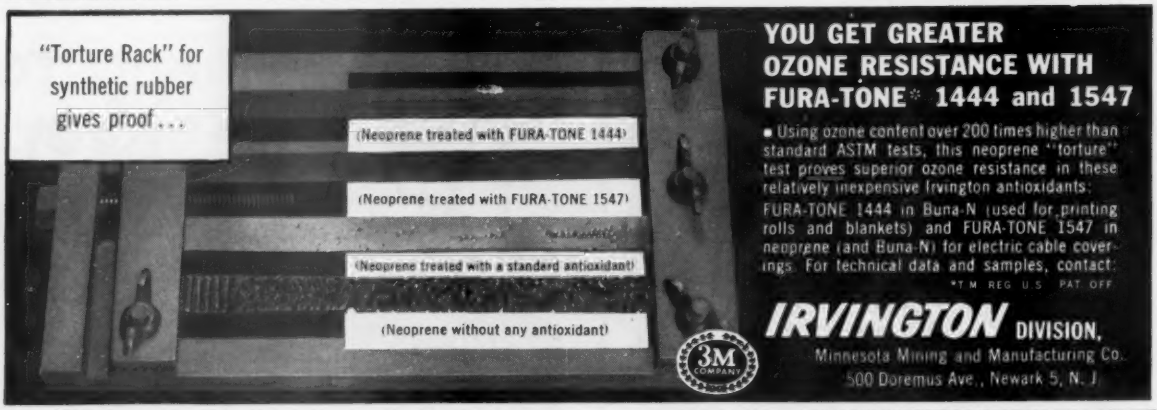
GUARANTEED REBUILT MACHINERY

MILLS, CALENDERS, TUBERS, VULCANIZERS, PUMPS, ACCUMULATORS, MIXERS, PULVERIZERS, HYDRAULIC PRESSES, CUTTING MACHINES

Immediate Deliveries from Stock

183-189 ORATON STREET
NEWARK 4, N. J.
CABLE: "URME"

UNITED RUBBER MACHINERY EXCHANGE


"Torture Rack" for synthetic rubber gives proof . . .
(Neoprene treated with FURA-TONE 1444)
(Neoprene treated with FURA-TONE 1547)
(Neoprene treated with a standard antioxidant)
(Neoprene without any antioxidant)

YOU GET GREATER OZONE RESISTANCE WITH FURA-TONE* 1444 and 1547

• Using ozone content over 200 times higher than standard ASTM tests, this neoprene "torture" test proves superior ozone resistance in these relatively inexpensive Irvington antioxidants: FURA-TONE 1444 in Buna-N (used for printing rolls and blankets) and FURA-TONE 1547 in neoprene (and Buna-N) for electric cable coverings. For technical data and samples, contact:

*T.M. REG. U.S. PAT. OFF.

IRVINGTON DIVISION,
Minnesota Mining and Manufacturing Co.
500 Doremus Ave., Newark 5, N. J.

BB CO.

Bedford-Bolling Co., Inc.

3190 East 65th Street • Cleveland 27, Ohio

1000 Gal. Ribbon Blender with 40 HP Drive
20 x 22 x 50″ Mill with 100 HP Drive
18 x 54″ Mill
22 x 66″ 3-Roll Calender with DC Drive

Used and Rebuilt Machinery for Rubber and Plastic Processing

WILLIAM TAPPER

USED RUBBER WORKING MACHINERY

Two 60″ mills, heavy duty—Top Cap
66″ 3-roll calender
20″ x 58″ 4-roll inverted "L"
We build new lab mills: 6″ x 12″ and 8″ x 16″
We pay cash for your surplus machinery.
Write for complete list of new and used rubber equipment.

30 South Broadway, Yonkers, N. Y.

PHONE: YONKERS 3-7455
CABLE: WILTAPPER YONKERS, N. Y.

NEW and REBUILT MACHINERY

SINCE 1891

L. ALBERT & SON

Trenton, N. J. — Akron, O. — Chicago, Ill. — Los Angeles, Calif.

Index to Advertisers

Accurate Steel Rule Die Manufacturers 949
Adamson United Co. 823
Aetna-Standard Engineering Co. ..... —
Akron Equipment Co. ..... —
Akron Employment Service 980
Akron Rubber Machinery Co. 962, 984
Akron Standard Mold Co. ..... —
Albert, L., & Son 984
Alco Oil & Chemical Corp. 953
Aldrich Pump Co. ..... —
Allied Chemical & Dye Corp. 827, 849
American Cyanamid Co.
Intermediate & Rubber Chemical Dept. 965
Pigments Div. 873
American Enka Corp. ..... —
American Resinous Chemicals Corp. 948
American Viscose Corp. 848
American Zinc Sales Co. 843
Ames, B. C., Co. 955
Archer Rubber Co. 982
Argus Chemical Corp. ..... —
Atlas Electric Devices Co. 952

Baker Castor Oil Co. ..... —
Barrett Division 827
Bedford-Bolling Co., Inc. 984
Bell Kaolin ..... —
Bestread Products Co. 982
Bolling, Stewart, & Co., Inc. ..... —
Brockton Cutting Die & Machine Co., Inc. ..... —
Brooklyn Color Works, Inc. 981
Burgess Pigment Co. 958

Cabot, Godfrey L., Inc. 837, 860, 933
Cambridge Instrument Co., Inc. 949
Carter Bell Manufacturing Co. 956
Celanese Corp. of America 844
Chemical Publishing Co., Inc. ..... —
CLASSIFIED ADVERTISING 980-84
Cleveland Liner & Manufacturing Co. 870
Clifton Hydraulic Press Co. 983
Columbia-Southern Chemical Corp. 871
Columbian Carbon Co. ..... Insert Following 912, 946
Concord Mica Corp. 981
Consolidated Products Co. 984
CONSULTANTS SECTION 982
Continental Carbon Co. 862-863
Continental Machinery Co., Inc. 977
Custom Machine & Design, Inc. 962
Coulter, James, Machine Co. 961
Cumberland Engineering Co., Inc. ..... —

D. P. R., Inc. 947
Darlington Chemicals, Inc. 947
Davis-Standard Sales Corp. 838
Day, J. H., Co. 824
Dayton Rubber Co. 977
Diamond Alkali Co., Pure Calcium Prod. Div. ..... —
Dow Corning Corp. 845
Drake Personnel, Inc. 980
du Pont de Nemours, E. I., & Co., Inc.
Elastomers Div. ..... Second Cover, 835

Emery Industries, Inc. 939
English Mica Co. ..... —
Enjay Co., Inc. 935
Erie Engine & Manufacturing Co. 957
Erie Foundry Co. ..... —

Falls Engineering & Machine Co. ..... —
Farrel-Birmingham Co., Inc. 853, 877
Ferry Machine Co. 975
Flexo Supply Co., Inc. 980
French Oil Mill Machinery Co. 864

Gammeter, W. F. Co. 981
General Aniline & Film Corp. 839
General Electric Co., Silicone Products Dept. ..... —
General Latex & Chemical Corp. ..... —
General Magnesite & Magnesia Co. ..... —
General Tire & Rubber Co. 846, 847
Genseke Brothers 817
Gidley, Philip Tucker 982
Giffels & Vallet, Inc. ..... —
Glidden Co.
Chemicals-Pigments-Metals Div. 858-859
Goodman, G. F. Chemical Co. 815
Goodrich, B. F., Chemical Co. 815
Goodrich-Gulf Chemicals, Inc. 872
Goodyear Tire & Rubber Co.
Chemical Div. 818-819
Gross, A., & Co. 960
Gummi und Asbest 981

Hale & Kullgren, Inc. 982
Hall, C. P., Co. 943
Harshaw Chemical Co. 833
Harwick Standard Chemical Co. ..... Back Cover
Hercules Powder Co., Inc. 840
Heveatex Corp. 975
Hoggson & Pettis Manufacturing Co. ..... —
Holliston Mills, Inc. ..... —
Holmes, Stanley H., Co. ..... —
Howe Machinery Co., Inc. 982
Huber, J. M., Corp. 820

Independent Die & Supply Co. ..... —
Indoil Chemical Co. 867
Industrial Ovens, Inc. 951
Institution of the Rubber Industry ..... —
Irvington Varnish & Insulator Div. 984

Johnson Corp. 953
Johnson Steel & Wire Co., Inc. 868-869
Johnson Machinery Co. 983

Kautschuk und Gummi ..... —
K. B. C. Industries, Inc. 982
Kellog, M. W., Co. 875
Kentucky Color & Chemical Co. 864
Kingsbacher-Murphy Co. 955
Korbet Corp. 856

Ladd Research Industries, Inc. 982
La Goma ..... —
Lambert, E. P., Co. 955
Lehmann, J. M., Co., William R. Thropp
& Sons Div. 836
Litzler, C. A., Co., Inc. 826

Mapico Color Division 946
Marbon Chemical Div. 825
Marine Magnesium Div. ..... —
Maryland Cork Co., Inc. 982
Merck & Co., Inc. ..... —
Merrill Lynch, Pierce, Fenner & Beane 967
McNeil Machine & Engineering Co. 979
Monsanto Chemical Co.
Rubber Chemical Dept. ..... —
Plastics Div. ..... —
Mt. Hope Machinery Co. 979
Mount Vernon-Woodberry Mills, Inc. ..... —
Muehlstein, H., & Co., Inc. 927

National Aniline Div. 849
National Chemical & Plastics Co. ..... —
National Forge & Ordnance Co. 961
National Roll & Foundry Co. 931
National Rosin Oil Products, Inc. ..... —
National Rubber Machinery Co. ..... —
National Sherardizing & Machine Co. 982
National-Standard Co. 850
Naugatuck Chemical Division
U. S. Rubber Co. 880
Nelson Employment Service 980
Neville Chemical Co. 969
New Jersey Zinc Co. 822

Olin Mathieson Chemical Corp. ..... —
Olin, R. R., Laboratories 982
Osborn Manufacturing Co. ..... —

Pan American Chemicals ..... —
Parsons-Plymouth, M. W., Inc. ..... —
Pasadena Hydraulics, Inc. 959
Paterson Parchment Paper Co. 944
Pennsylvania Industrial Chemical Corp. ..... —
Pequanoc Rubber Co. 982
Petro-Tex Chemical Corp. 879
Phillips Chemical Co.
Philblack 816
Philprene 851
Pittsburgh Coke & Chemical Co. ..... —
Pittsburgh Steel Co. 868-869
Plandex Corp. ..... —
Polychemicals Div., West Virginia Pulp & Paper
Co. 957
Polymel Corp. ..... Third Cover
Polymer Corp., Ltd. 941
Progressive Service Co. 975
Pure Carbonic Co. 852

Rand Rubber Co. 956
Randall, Frank E., Co., Inc. 973
Rare Metal Products Co. ..... —
Reed, H. B., & Co., Inc. ..... —
Reliable Rubber & Plastic Machinery Co. 983
Revue Générale du Caoutchouc ..... —
Rhodia, Inc. 942
Richardson, Sid, Carbon Co. 986
Rotex Rubber Co., Inc. ..... —
Royle, John, & Sons 947
Rubber Corp. of America 963
Rubber Age Circulation 983
Rubber Age Books 866, 929, 979
Rubber Journal 977
Rubber Red Book 854-855, 967

St. Joseph Lead Co. 828
Scott Testers, Inc. 979
Semet-Solvay Petrochemical Div. ..... —
Sharples Chemicals Div. ..... —
Shaw, Francis, & Co., Ltd. ..... —
Shell Chemical Corp. 841
Shiraishi Kogyo Kaisha, Ltd. 981
Siempelkamp, G., & Co. 937
Silicones Division, Union Carbide & Carbon
Corp. ..... —
Simplex Cloth Cutting Machine Co., Inc. ..... —
Skelly Oil Co. 876
Skinner Engine Co. ..... —
Snell, Foster D., Inc. 953
South Florida Test Service 982
South Texas Tire Test Fleet Inc. ..... —
Southeastern Clay Co. ..... —
Southern Clays, Inc. 842
Spadone Machine Co. ..... —
Stamford Rubber Supply Co. 949
Stoner's Ink Co. 981
Sun Oil Co. 945
Synvar Corp. ..... —

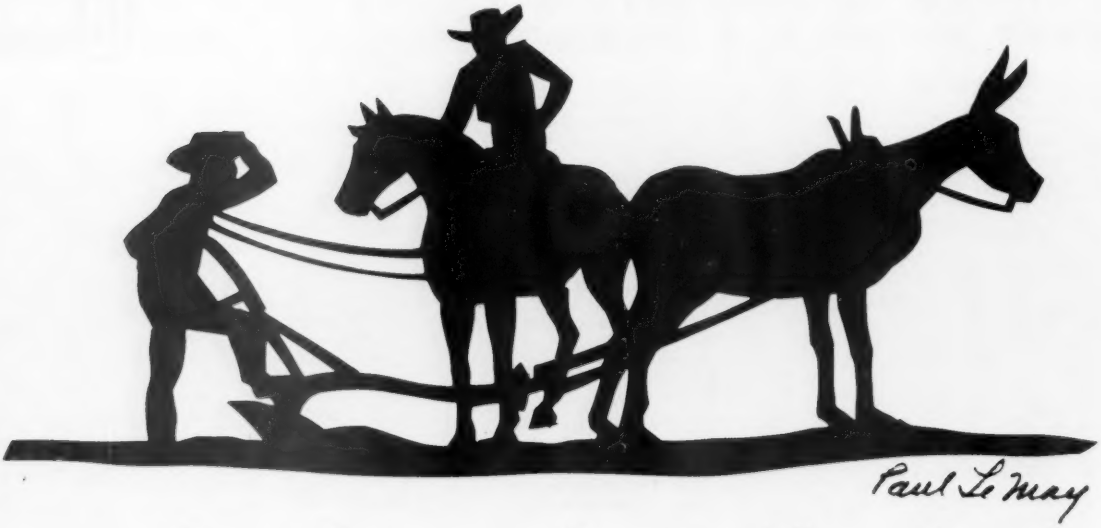
Tapper, William 937, 984
Taylor Instrument Companies ..... —
Taylor-Stiles & Co. 950
Texo Corp. ..... —
Thiokol Chemical Corp. 865
Thomaston Mills 973
Thropp, William R., & Sons, Div.
J. M. Lehmann Co. 836
Titanium Pigment Corp. 834
Trade News Service ..... —
Treasury Dept. 874

Union Carbide & Carbon Corp.,
Silicones Division ..... —
United Carbon Co., Inc. ..... Insert Following 830
United Clay Mines Corp. 878
United Engineering & Foundry Co. 861
United Rubber Machinery Exchange 984
U. S. Rubber Co.
Naugatuck Chemical Div. 880
U. S. Rubber Reclaiming Co., Inc. ..... —
Universal Hydraulic Machinery Co. 984
Utility Manufacturing Co. 957

Vanderbilt, R. T., Co. ..... Front Cover
Vapor Heating Corp. ..... —
Velsicol Chemical Corp. 829

Washington Rubber Co. 982
Watson-Standard Co. 856
Wellington Sears Co. 830
West Virginia Pulp & Paper Co. 957
Western Supplies Co. 954
White, J. J., Products Co. 959
Whittaker, Clark & Daniels, Inc. 961
Williams, C. K., & Co., Inc. ..... —
Witco Chemical Co. 862-863
Woloch, George, Co., Inc. 959
Wood, R. D., Co. 857

HUGHES PRINTING CO.
EAST STROUDSBURG, PA.



...backward method

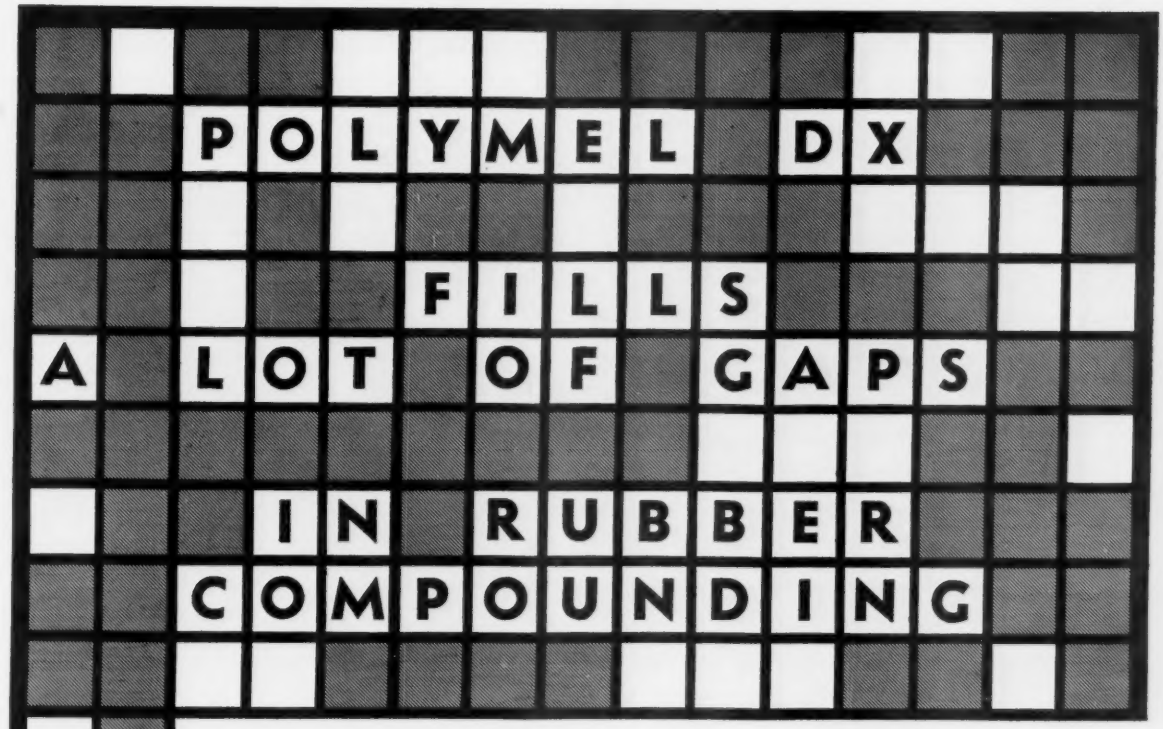
In these days of tough competition it's necessary to keep costs down in order to operate profitably. Any compounder who fails to take advantage of the savings available with ***TEXAS CHANNEL BLACKS*** is missing a real opportunity to lower costs without sacrificing quality.

TEXAS CHANNEL BLACKS developed and produced by Sid Richardson Carbon Co. offer many savings when used alone or in combination with other types of carbon blacks. Numerous tests and actual performances indicate that with the use of ***TEXAS CHANNEL BLACKS*** savings can be obtained with no loss in ultimate performance.

TEXAS
CHANNEL BLACKS
®

Sid Richardson
CARBON CO.
FORT WORTH, TEXAS

GENERAL SALES OFFICES
EVANS SAVINGS AND LOAN BUILDING
AKRON 8, OHIO



Few compounding ingredients offer the unusual combination of desirable qualities available in POLYMEL DX. This low-cost styrene copolymer resin functions basically as an efficient plasticizer for natural and synthetic rubber. However, the use of from 5 to 34 parts on the rubber hydrocarbon develops these extra, added benefits—

- ■ **Good flow and sharp detail in molded goods.**
- □ **Easy processing in extruded and calendered stocks.**
- ■ **Thorough dispersion of pigments.**
- □ **Faithful retention of uncured outline.**
- ■ **Reduced nerve and tack, good surface finish.**
- □ **Good electrical properties.**

POLYMEX DX is particularly efficient in high styrene stocks where its use permits *significant reduction* in the quantity of costly high styrene resin *with no appreciable change in physical or processing properties!*

Send today for a generous sample of POLYMEL DX, either in powder or 2" lump form. Better yet, order enough for a trial run.

Prices fob Baltimore

1 drum to 4900 lbs.	— .1475¢ lb.
5000 lbs. to truckloads	— .1425¢ lb.
Truckloads	— .1375¢ lb.

THE POLYMEL CORPORATION

MANUFACTURERS OF
compounding ingredients for reinforcing, plasticizing, extending and processing natural and synthetic elastomers.

Plaza 2-1240 — 1800 BAYARD ST., BALTIMORE 30, MD.

COLORS

for ALL Rubber and Plastics Compounding Requirements

*STAN-TONE

provides the Specific answer for every technical need in Color Compounding–

To assure faster pigment incorporation, cleaner color and more color permanence in the finished product . . .

***STAN-TONE PC - Paste . . .**
Color dispersed in plasticizer for organosol, plastisol and calendered vinyl resins.

***STAN-TONE GPE . . .**
Color dispersion in low molecular weight polyethylene for polyethylene, rubber and vinyls.

***STAN-TONE MBS - MASTERBATCH**
Colors plastic dispersed. Standardized in color intensity for precision color matching, cleaner compounding.

***STAN-TONE . . .** Rubber and vinyl inks.

***STAN-TONE . . .** Dry Colors . . . All colors for all purposes.

Write for complete technical data on colors for any need.
*** STAN-TONE is a name registered by Harwick Standard Chemical Co.**

Now Available...

STAN - TONE - PC WHITE PASTE
Titanium-White dispersed in DOP and Paraplex D-50

HARWICK STANDARD CHEMICAL CO.

60 SOUTH SEIBERLING STREET, AKRON 5, OHIO

BOSTON 16, MASS. 661 BOYLSTON STREET
TRENTON 9, NEW JERSEY 2595 E. STATE STREET
CHICAGO 25, ILLINOIS 2724 W. LAWRENCE AVE.
LOS ANGELES 21, CALIF. 1248 WHOLESALE STREET
ALBERTVILLE (ALA.) OLD GUNTERSVILLE HWY.

40th YEAR

Rubber Age

COVERING THE MANUFACTURE OF RUBBER AND RUBBERLIKE PLASTICS PRODUCTS

APRIL, 1956

In This Issue

Reinforcing rubber by electrostatic forces .....page 75

Meeting the challenge of modern transportation .....page 83

Abstracts of papers for RD meeting ...page 98

Determining the volume resistivity of PVC .....page 105

Letters .....page 14

News Hilites ..page 110

Index .....page 183

Contents .....page 9

ABC

COLOR

• Attracts
• Identifies
• Distinguishes

COLOR RODFORM, Ultras are the latest convenience available to the modern compounder.

Specify COLOR RODFORM, exclusive Vanderbilt products, when ordering Ultras. Their use in your plant eliminates costly compounding mistakes.

R. T. VANDERBILT CO., INC.
230 PARK AVENUE • NEW YORK 17, N. Y.